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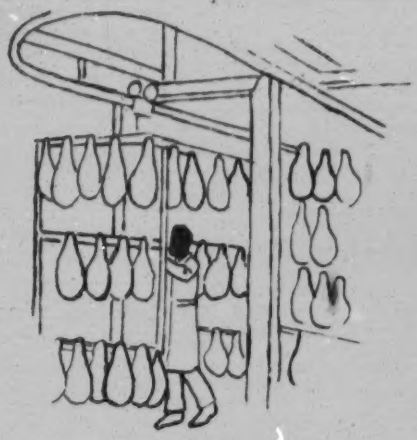
ABSTRACT

This curriculum guide in agricultural products (food processing) is one of 10 guides developed as part of a vocational project stressing agribusiness, natural resources, and environmental protection. The scope of this guide includes three occupational subgroups: meat, fish, poultry; dairy (milk) products; fruits and vegetables. It is meant as an aid to all who are involved in the curriculum planning phases prior to classroom instruction. Each unit has seven elements to be used for developing specific curriculum and curriculum materials: unit concept, student performance objectives, instructional areas, examples of learning activities, examples of evaluation processes, instructional materials or equipment, and references. Appendixes list recommended materials and equipment, additional references, and selected professional and technical societies. (Author/JC)



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Career Preparation in

AGRICULTURAL PRODUCTS (FOOD PROCESSING)

A Curriculum Guide

for High School Vocational Agriculture

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FOREWORD

This suggested Curriculum Guide in Agricultural Products (Food Processing) is one of ten guides developed under the direction of the Ohio Career Education and Curriculum Management Laboratory, Department of Agricultural Education, College of Agriculture, The Ohio State University, as a part of the project entitled, "Curriculum Development Basic to the Training of Individuals for Employment in Agribusiness, Natural Resources and Environmental Protection. The project was funded under a contract with the Bureau of Occupational and Adult Education, U.S. Office of Education.

The project grew out of the need to identify the educational experiences most appropriate for career development in agribusiness, natural resources and environmental protection. Educators were lacking adequate and accurate information for the career awareness and exploration stages of the career development process concerning the agribusiness complex. The agribusiness complex also had several emerging program areas where occupational competencies and the related curriculum had not been well defined at the vocational preparation level. These conditions caused appropriate career development programs to be lacking or ineffective at all levels, including vocational education.

In May of 1971, agricultural leaders representing state supervisors, teacher educators, classroom teachers and the agricultural business and industrial community met in Denver, Colorado, to discuss the changing nature of the field. There was general agreement that the developing emphasis on agribusiness, natural resources and environmental protection called for major curriculum changes and development of new curricula, with changes in the preparation of agricultural education personnel at the same time.

The purposes of this project were: (1) To develop appropriate curriculum guides in agribusiness, natural resources and environmental protection which provide a coordinated educational program, including career awareness, career exploration and preparation for a cluster of occupations; (2) To acquaint educational leadership in all states with the curriculum materials from this project and promote their use; and (3) To disseminate copies of the curriculum materials to leaders of each state.

ACKNOWLEDGEMENTS

This Curriculum Guide was developed by Eddie A. Moore, Curriculum Specialist Associate, Department of Agricultural Education, The Ohio State University, with assistance from the staff of the Ohio Career Education and Curriculum Management Laboratory in Agricultural Education and the project advisory committees. Appreciation is further extended to Dr. Elizabeth J. Simpson, Branch Chief, Curriculum Development Branch, Division of Research and Demonstration, Bureau of Occupational and Adult Education, and to the late Dr. Phillip Teske, Project Officer, Bureau of Occupational and Adult Education, U.S. Office of Education, for their direction during the preparation of this guide. Also, gratitude is extended to the teachers and industry personnel who have given time from their jobs to assist in a critique of the guides.

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AGRICULTURAL PRODUCTS
(FOOD PROCESSING)

THE USE OF THIS CURRICULUM GUIDE

There is less than full agreement on just what constitutes a particular type of curriculum document. The curriculum guide is no exception. The following is not meant as an effort to debate curriculum terminology further, but rather to clarify how this document can be used more effectively for its intended purpose.

Entitled a curriculum guide, it is designed to answer the more basic questions of curriculum planning and development - what should be taught and, to some degree, how and with what resources. It is not intended to be taught from nor to be used as instructional material in the classroom by either teacher or students.

It is meant as an aid to all who are involved in the curriculum planning phases prior to classroom instruction. For administrators and others who must make decisions concerning facilities or equipment, specifications for facilities and equipment lists are included in the guide. For guidance counselors or others working with students on career decisions, information is provided concerning occupations and the types of competencies and characteristics needed by the workers for these occupations. For the curriculum specialist, teacher educator, state supervisor or others responsible for determining instructional content and preparing teachers to conduct instructional programs, the guide defines the needs of the students in terms of terminal performances. All other aspects of curriculum content, teaching processes and instructional resources are based upon the terminal performance objectives for the students.

The scope of the guide includes three occupational subgroups within the Agricultural Products (Food Processing) area. These are consistent with and coded as defined in the Standard Terminology for Curriculum and Instruction in Local and State School Systems. The overall area of Agricultural Products (Food Processing) is given the designation 01 04 00 00 00. The occupational subgroups have the following designations:

Meat, Fish, Poultry	01.04 01 01 00
Dairy Products	01.04 01 02 00
Fruits and Vegetables	01.04 01 03 00

The occupations considered in these three subgroups are limited to those on the career ladder for which high school vocational instruction is either necessary or significantly desirable. The units within the guides are built upon minimum levels of competencies for entry level jobs. However, it is assumed that, even though students must begin at this entry level job, many will soon be striving to advance. Whenever the employee is presented with other desirable job opportunities, it is intended that his vocational instruction will help him master early job opportunity advances in an efficient manner.

Some states have provided that approximately 2,000 hours be used during the junior and senior years for instruction, laboratory and cooperative on-the-job experience in a specialized Agricultural Products (Food Processing) program. While this guide may not cover all possible instructional sequences, there is likely to be more included in this guide than would be used in any one program involving 2,000 hours. It is intended that the users of this guide will select those instructional areas to build an instructional package which most appropriately meets the student's needs in that state or locality.

In preparing this guide, the writer attempted to identify performance objectives which might be accomplished in an Agricultural Products (Food Processing) program. Those performance objectives which are only appropriate to limited localities have not been included.

It is intended that the objectives stated in this guide would save time and effort for state personnel who have the responsibility for defining the occupational competencies in Agricultural Products (Food Processing).

Once the objectives from the guide which are common to the state curriculum needs are defined, they could be used to facilitate stating more specific levels of objectives. Or, if other objectives are more appropriate, they could be substituted for those presented as state or local conditions warranted.

ORGANIZATION OF INSTRUCTIONAL UNITS

This curriculum guide is composed of units of instruction. Each unit is developed around a closely-related group of performance objectives which are basic to the training of individuals for entry level skilled employment in Agricultural Products (Food Processing) occupations. The units are organized into three Agricultural Products (Food Processing) areas of milk; meat, fish, poultry; and fruit and vegetable processing.

The instructional units are based upon the competencies of entry level skilled occupations in Agricultural Products (Food Processing). Most of the performance objectives for the units are common to Agricultural Products (Food Processing) programs.

FORMAT OF THE UNITS OF INSTRUCTION

Each of the units of instruction has seven elements to be used for developing specific curriculum and curriculum materials. The list of elements includes:

1. Unit Concept
2. Student Performance Objectives
3. Instructional Areas
4. Examples of Student Learning Activities
5. Examples of Processes to Evaluate Student Performance
6. Instructional Materials or Equipment
7. Examples of Supporting References

A Description of the Seven Elements of the Units of Instruction

Unit Concept

The unit concept defines the rationale for the area covered by the instructional unit.

Student Performance Objectives

The student performance objectives have been considered the basic element of the units of instruction. All other elements are developed from the performance objectives. The objectives are stated in student terms at a terminal performance level. The terminal performances have been defined

from an analysis of competencies necessary for successful performance in the entry level skilled occupations of Agricultural Products (Food Processing).

The performance objectives of the guide are intended to aid curriculum specialists and teachers of local Agricultural Products (Food Processing) programs in defining the competencies which can and should be acquired by students in local programs.

It was felt that competent teachers of a vocational program would be in the best position to establish "how well" the objective should be performed, and the conditions under which it should be performed. However, conditions and standards have been indicated for most objectives. The intent is to direct attention to those conditions which may significantly affect achieving the performance and identify standards which may be especially important to success in the industry.

Instructional Areas

The performance objectives are descriptions of intended outcomes which require the acquisition of certain knowledge and skills. Titles and subtitles of instructional areas are used to define the relevant content.

The titles are presented in an action form as far as is feasible to help define the specific type of learning expected to achieve the objectives. That is, in defining study areas concerning the use of sanitizers, rather than limiting the title by using "The Use of Sanitizers," the study areas of "Measuring Sanitizers" and "Mixing Sanitizers" are used. The gerund verb form or "-ing" form of the title is to aid in more specifically defining the competencies to be brought out in the learning processes.

Because of the specific nature of much of the learning materials needed for these instructional areas, references are cited which would be appropriate for curriculum developers. The titles for the instructional areas are of a relatively permanent nature and common to most programs. The specific content to support them is much more adversely affected by changes in technology, geographical differences or differences in local occupational characteristics.

It may be possible to use the suggested titles over a period of time with relatively minor adjustments. Specific content, on the other hand, needs to be continually updated to current conditions and matched with local student needs and occupational characteristics.

The numbers of the instructional area titles are not matched to the numbers of the student performance objectives. However, instructional areas relating to an objective can be determined relatively easily. The instructional areas are sequenced as much as is feasible in the same order as the performance objectives to which they relate.

Examples of Student Learning Activities

Examples are provided suggesting ways in which students may be actively involved in learning activities that would help them achieve the objectives. They are offered as one approach that may be used rather than intended to be the complete list of activities which would provide the most effective learning. The suggested activities for each objective may or may not cover the entire objective. Therefore, development of other activities for the local program will be necessary for a comprehensive program.

There is at least one activity for each student performance objective. The number on the activity is the same as the student performance objective to which it is related.

Examples of Processes to Evaluate Student Performance

The student evaluation should be directed toward and based upon well-written student performance objectives. In this guide, the student performance objectives are intended to be explicitly stated in what terminal performance the student is to be able to do and, to some degree, how well and under what conditions. Primarily, the evaluation is to use the stated objectives as a reference point to answer the question - can the student achieve the desired performance level.

In addition, an element designated as "Examples of Processes to Evaluate Student Performance" is included in each unit of instruction. Examples of evaluation processes are intended to assist in determining the level of understanding of the ability of the student to accomplish parts of or the entire performance objective. These processes are not intended to replace a direct evaluation of the terminal performance as stated in the objective.

The type of evaluation process is determined in part by the nature of the performance objectives. But the most desirable method can be best determined when there is knowledge of the local situation, such as educational resources, school policies and the needs of the students.

There is at least one evaluation process for each student performance objective. The number of the evaluation activity is the same as the student performance objective to which it is related.

Instructional Materials or Equipment

Materials or equipment are noted which are specific to the unit and which are considered essential or quite desirable in the learning process. In some cases, the objectives would be quite difficult to achieve, if at all, without the materials. In others, the materials or equipment aid in the effectiveness or efficiency of learning.

The materials and equipment suggested for one unit are not necessarily consumed or unique just to the learning activities of that unit. A list of the equipment suggested for a comprehensive Agricultural Products (Food Processing) program is listed in Appendix A.

Examples of Supporting References

A limited number of references has been listed which directly relates to the curriculum study areas suggested in the "Instructional Areas" section. These references are available and the sources or details of securing them are located in Appendix B of this guide.

When two or more references are found to have adequate learning materials and processes for the objectives of a unit but have uniquely different styles, the group may be listed so that the teacher has the choice of selecting the one most suited to his teaching.

In some cases, several references are noted because no one reference adequately covers all of the objectives of a unit or study area. Annotations of the references are provided to aid in determining which reference or references would be best suited for a local program. The reference suggested for one unit is often relevant to and suggested for use in several of the units. In no way should the references be considered the best or only references to be used with the units.

RECOMMENDED FACILITIES AND EQUIPMENT

Suggestions for Planning the Facilities for Agricultural Products (Food Processing) Programs

The nature and the extent of the facilities needed for Agricultural Products (Food Processing) instruction will be influenced by the type of food processing program (milk, livestock, poultry, fish, fruits, vegetables and nuts processing), the projected enrollments and the planned use of facilities by Continuing Education and other groups. The suggestions which follow are to be considered only as guides for school facility planners and architects.

Space Allocations

Recommended minimum space allocations for accommodating twenty-five students per section include:

Classroom	750 square feet
Office and Conference Room	200 square feet
Agricultural Products Processing Laboratory -	5,860 square feet

Classroom

The classroom should be equipped with tables and chairs or desks to accommodate twenty-five students; a tack board; a chalk board; a teacher's work bench with sink, running water, gas, air and electrical outlets; book shelves; cabinets with locks; and filing cabinets.

Artificial lighting should provide a minimum of 75 foot candles on the student's desk or table top. Convenient outlets should be installed on each wall. Adequate storage space for equipment, supplies, charts, specimens, models and trophies should be provided in cupboards and drawers. Enclosed storage cabinets are preferred. A minimum cabinet area would be twelve feet long, eight feet high and eighteen inches deep. Shelves and cases should be constructed for books, reference materials, department library bulletins, magazines, other publications and teaching materials.

Agricultural Products Processing Laboratory

Facilities in the Agricultural Products Processing Laboratory should be

comparable to the facilities found in the type of food processing industry the student is to be prepared to enter. The laboratory floor should be of concrete with proper drains. Lighting, heating, ventilation, and electrical outlets should be installed according to local and state building codes. Restrooms for ladies and gentlemen with a minimum of twenty-five lockers should also be a part of the processing facilities.

Recommended Equipment and Supplies

The types and quantities of equipment and supplies required to provide effective occupational education in Agricultural Products (Food Processing) is dependent upon the type of food processing industry the student is to be trained for, the anticipated type of people (secondary or adult) to be served, and other factors.

The optimum class size is considered, for planning purposes, to be about twenty-five pupils. Sufficient quantities of tools, equipment and supplies should be provided to enhance the learning of students.

Provision should be made, when it is possible to do so, to purchase various brands of the same items. This will provide opportunities for student learners to become familiar with the products of competing manufacturers.

An advisory committee composed of representatives of local segments of the Agricultural Products (Food Processing) industry can provide valuable assistance in developing lists of needed equipment and supplies.

A list of equipment that can be used as a guide in ordering and assembling items needed for the various Agricultural Products (Food Processing) programs is located in Appendix A. The list is not considered to be complete but includes some of the basic items needed to conduct a relevant and meaningful program.

TEACHER REQUIREMENTS AND RESPONSIBILITIES

The effectiveness of an Agricultural Products (Food Processing) program depends largely upon the educational background, experiences and personal qualities of the faculty. The specialized nature of the curriculum requires that the teacher(s) be proficient in processing the type of products emphasized in the program. In essence, if the Agricultural Products (Food Processing) program was established to prepare livestock meat carcasses for consumers,

then the teacher should be proficient in slaughtering and preparing livestock carcasses rather than in processing other food products such as poultry or fish.

The teacher(s) should understand the educational philosophy, the objectives and the specific requirements of the program. They will need to be able to organize and develop programs for each student-learner so that the individual can meet the requirements of the occupational cluster(s) that he or she is preparing to enter.

Teachers should be certified on the basis of completion of a degree in Agricultural Education with specialization in Agricultural Products (Food Processing) and this certification should also require a period of occupational experience in the area. However, because of the shortage of fully certified personnel, it may be necessary to employ persons whose technical competence has been developed through occupational experience in Food Processing. These persons should be certified with the stipulation that they complete a planned in-service education program designed to develop professional competencies desired or necessary for full certification. Responsibilities of the teachers include:

1. Planning, developing and evaluating Agricultural Products (Food Processing) so that student and manpower needs are met
2. Planning instruction
3. Executing instruction
4. Evaluating instruction
5. Managing the program
6. Guiding and counseling the students
7. Planning, developing and evaluating school-community relations and activities
8. Advising youth organizations
9. Identifying and executing the professional role and development of a professional educator
10. Coordinating occupational experience programs

Motivation and morale building should be a part of every class and laboratory session. It is suggested that the instructor make an effort early

in the program to establish an environment which will heighten and maintain student-learner's interest. The success of the program can be judged in part by the number of students who remain gainfully employed in careers which would otherwise not have been available to them.

Advisory Committees

Advisory committees utilizing community resource persons can assist the secondary institution administration in planning and implementing Agricultural Products (Food Processing) programs to meet the objectives of the institution, the student and the community.

The special advisory committee should include representatives of employers and public employment services, scientific or technical societies and associations in the field and knowledgeable civic leaders who meet with and advise the specialists on the school staff. The committee normally consists of about nine to twelve members who generally serve for a one-to three-year period. The head of the institution or the department head is ordinarily chairman. Members are appointed for regular terms, subject to reappointment, and membership should rotate so that some experienced advisors are present with some new ones each term. It should be remembered that advisory committee people are busy; therefore, meetings should be called only when committee action can best handle a specific task or problem.

Letters of appointment should come from the chief school administrator. While the committee functions without legal status or powers, it can provide invaluable assistance to the institution by assisting in a feasibility study of proposed new educational programs, by providing support to school administrators in obtaining appropriations and state and federal support to finance the programs, by assisting in the location of work experience stations, by surveying and defining the knowledge and skills needed by Agricultural Products workers, and by assisting in the placement of graduates (in jobs).

This guide, designed primarily for planning and development of programs in high schools, can be used by the advisory committee as a starting point, modifying it to meet local needs. The program can also form the basis for courses to meet the requirements of employed adults who wish to upgrade or update their skills and technical capabilities. In this way, the school administration, with the help of the committee and special consultants, can effectively initiate the needed program, quickly develop it to a high level of excellence and maintain its timeliness.

SCIENTIFIC AND TECHNICAL SOCIETIES AND TRADE ASSOCIATIONS

Scientific and technical societies, commercial firms, and trade groups are an important source of instructional materials and other benefits for teachers and students. The societies, in their publications and at meetings

provide continual exposure to the most recent developments in the science and related technologies and probably serve as the best means for helping persons keep up-to-date in a particular phase of the science.

Less conspicuous, but extremely important, is the support which societies may give: (1) in helping to develop evidence of the need for the training program; (2) in helping to promote the program; (3) in enlisting member's support for the program; (4) in helping to provide work experience for students; and (5) in helping with the placement of graduates.

Associations and societies may supply resource people to speak to classes. They may also serve as hosts to student groups on field trips to study specific phases of the industry.

The following is a selected listing of some of the organizations and associations which are pertinent to the Agricultural Products (Food Processing) industry: *

American Meat Institute
Institute of American Poultry Industries
Institute of Food Technologists
Institute of Sanitation Management
National Agricultural Chemicals Association
National Association of Frozen Food Packers
National Canners Association
National Fisheries Institute
National Prepared Frozen Food Processors Association
Processed Apples Institute, Inc.

EMPLOYMENT OPPORTUNITIES IN AGRICULTURAL PRODUCTS (FOOD PROCESSING)

Agricultural Products (Food Processing) is defined as the knowledge of and skills in the preparation and processing of food products. In order for one to become proficient in preparing and processing food products for sale and consumption, the individual must be knowledgeable in terms of the processes involved in a given food processing industry.

Employment opportunities in Agricultural Products (Food Processing) are

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* See Appendix C for complete addresses of these organizations and associations.

not as plentiful as they once were due to mechanization. Because of mechanization in industries, very few jobs are available for the unskilled worker. Today's food processing employee must be proficient in performing certain tasks if the processing operations are to be maximized. Persons who desire to become employed in any of the Agricultural Products (Food Processing) occupations may do so only with the proper training, the motivation to work hard, an awareness of technological changes, and the ability to work with others while processing high quality products for consumption.

As the population continues to grow, there will be a continuous need for skilled food processing plant workers. Persons qualified and willing to prepare for careers in the field should find adequate opportunities to pursue their chosen career. A partial list of typical entry level occupations presently found in Agricultural Products (Food Processing) for persons completing the program outlined in this guide might include:

MAJOR OCCUPATIONAL GROUP:	ENTRY LEVEL SKILLED OCCUPATION:	D.O.T. NO.:
Meat Processing	All-Round Meat Butcher	525.381
	Meat Counterman	290.877
	Livestock Slaughtering and Packaging Plant Employee:	525.884
	Carcass Splitter	
	Swine Dehairing-Machine Operator	
	Poultry Processing Plant Employee:	525.887
	Picking Machine Operator	
	Poultry Dresser	
	Fish Processing Plant Employee:	525.884
	Scaling Machine Operator	
	Filleting Machine Operator	
Milk Processing	Milk Processing Plant Employee:	529.782
	Processing Equipment Operator	
	Cooler Man	
Fruit and Vegetable Canning	Fruit and Vegetable Canning Processing Plant Employee:	
	Equipment Operator	529.885
	Dumper	529.886

VALIDATION OF AGRICULTURAL PRODUCTS (FOOD PROCESSING) UNITS

The Agricultural Products (Food Processing) units have been developed with the use of curriculum guides and instructional materials accumulated from various sources throughout the United States. Because of the limited number of guides and instructional materials in this taxonomy area, the developer resorted to Food Processing industry persons for assistance in developing the guide. The units contained in this guide will hopefully provide a base for program planning and development of the local programs by state curriculum planners, state supervisors, teacher educators and teachers.

The terminal objectives cited at the beginning of the units were based upon occupational analyses conducted by the project staff, and/or other occupational analyses in the various occupational cluster areas of Agricultural Products (Food Processing) by various individuals throughout the United States.

Revisions and improvements on this guide were made as a result of the valuable input made by vocational agriculture teachers and supervisors, state and national curriculum specialists, and industry representatives.

As mentioned earlier, there are limited numbers of curriculum guides and instructional materials in the Agricultural Products (Food Processing) area. The fact is perhaps justified because of the small number of Agricultural Products (Food Processing) programs at the secondary level in the United States today. The materials presented in this guide should provide a base for planning and developing relevant and meaningful programs at the secondary level.

I

AGRICULTURAL PRODUCTS (FOOD PROCESSING)

U.S.O.E. CODE 01.04 00 00 00

UNITS GENERAL TO THE AGRICULTURAL PRODUCTS (FOOD PROCESSING) AREAS

Occupational Opportunities in Agricultural Products (Food Processing)

Human Relations in Agricultural Products (Food Processing)

Developing Leadership Through FFA

Grooming Essentials and the Use of Hygienic Practices in Processing Food Products

Insect and Rodent Control in Food Processing Plants

Cleaning and Sanitizing Chemicals Used in Food Processing Plants

The Use of Food Processing Labeling Equipment

Storing Food Products

Shipping Processed Food Products

OCCUPATIONAL OPPORTUNITIES IN AGRICULTURAL PRODUCTS (FOOD PROCESSING)

UNIT CONCEPT: The field of agricultural products (food processing) includes a broad spectrum of career opportunities the student may wish to explore. By studying the various occupations, the student is able to consider various factors, such as working conditions, salary and requirements for entry that will influence his career choice.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. In seeking information about job opportunities, conduct surveys or obtain literature which will assist him in determining the number and kind of job opportunities that are available in agricultural products.

2. Given a specific career in which the student is interested, determine the competencies and requirements needed by persons to enter and advance in that career.

3. Upon determining the requirements and competencies needed to enter a job, develop a personal plan which will aid him in acquiring the competencies and meeting the requirements needed for entry in that job.

4. Upon identifying a job in which he is interested, follow the proper procedures necessary to become placed on the job.

5. Upon securing placement on a job, work with other employees, the employer and/or customers in a manner that will enable the student to succeed on the job.

B. INSTRUCTIONAL AREAS

1. Assessing the job opportunities available in agricultural products (food processing)

a. Locating information regarding the scope of agricultural products and food processing occupations and the opportunities for employment

b. Surveying the local region for entry level jobs regarding the number of openings per year and future employment needs

2. Making a detailed study of selected food processing occupations

a. Determining personal interests and how they relate to a specific job or cluster of occupations

b. Assessing the competencies that are needed for entry

c. Determining the educational requirements necessary for employment

d. Assessing the personal traits required by the occupation

e. Determining the worker benefits in a given occupation

f. Considering state and federal regulations which apply to various occupations

3. Developing a personal plan for obtaining experiences necessary for gainful employment in a given occupational area

a. Planning activities that will enable the student to be exposed to experiences which will aid in his employment

b. Working with cooperators in developing the occupational experience program

c. Recording the activities of the occupational experience program

d. Supervising and evaluating the student's occupational experience program

4. Securing a job

a. Locating potential jobs through various sources

b. Assessing the job description and the student's interests

c. Applying for a job

(1) Writing a letter of application
(2) Preparing a resume
(3) Securing references and recommendations

d. Completing the required comprehensive examination for the job

e. Participating in the personal interview

5. Considering factors important to job success and advancement

a. Establishing rapport with fellow employees, the public and the employer

b. Determining the impact of personal grooming upon the public, the employer and fellow employees

c. Following directions and working independently in an occupation

d. Developing desirable work habits

e. Continuing self improvement on the job

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. Conduct a survey by personal contact or questionnaire of food processing plants to determine the number of personnel employed in various jobs in food processing and the number of openings each year.

2. Interview several persons in specific occupations and determine the competencies and requirements needed to enter the occupation.

3. a. Write a letter of application and fill out an application form. Have the class members critique them.

b. Visit area food processing plants and discuss with plant supervisors and managers the factors they consider in hiring an employee.

4. Using simulation techniques, have the students role play job interviews. Record the interviews on a tape recorder and have each

student critique his own presentation. To guide the students in the critique, have the class develop a list of criteria for job interviews and check themselves against these criteria.

5. Using a panel composed of employers and employees, have the class discuss with them the development and maintenance of working relationships between employees and employer.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Using a list of agricultural products (food processing) job titles, have the students match these to the most appropriate food processing area. These job titles could also be matched to level of position, such as skilled, semi-skilled, technical and professional. These tasks should be accomplished with 90% accuracy to allow for variation in job title names.

2. Have each student complete a survey of a given occupation or cluster of occupations which assesses the competencies needed for employment, the educational requirements for gaining employment and the personal characteristics needed for successful employment, to the satisfaction of the teacher.

3. Have each student complete a personal plan for obtaining employment in his desired occupation which should include the necessary educational and work experiences in addition to any special competencies that need to be acquired.

4. Have each student develop a list of points to remember or a check list for writing a letter of application for a particular job. This list should include such items as neatness, proper introduction of applicant, where applicant can be contacted, request for necessary application forms, completeness, and personal references.

5. The teacher should evaluate each student as to his ability to work with others in the classroom, while involved in organizational activities and/or in a cooperative placement situation. The student should complete a personal evaluation sheet to be used when discussing his abilities, attributes and weaknesses with the teacher.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Samples of job application forms, letters of application, occupational survey forms, personal characteristics check lists, and copies of state and federal labor regulations

2. Appropriate tables, desks, chairs and tape recorder or video tape machines necessary for conducting simulated job interviews

3. Written notices from newspapers, journals and other publications listing various job openings

F. EXAMPLES OF SUPPORTING REFERENCES

1. Dictionary of Occupational Titles; Volume I, Definitions of Titles. Third Edition. Washington, D.C.: Manpower Administration, U.S. Department of Labor, Superintendent of Documents, U.S. Government Printing Office. 1965, 809 pages.

   This government document will assist teachers in advising students of job titles and descriptions in their interest areas.

2. Dictionary of Occupational Titles; Volume II, Occupational Classification and Industry Index. Third Edition. Washington, D.C.: Manpower Administration, U.S. Department of Labor, Superintendent of Documents, U.S. Government Printing Office. 1965, 656 pages.

   Volume II is a complementary reference to Volume I and will give additional information about job requirements and opportunities.

3. Hoover, Norman K. Handbook of Agricultural Occupations. Danville, Illinois: The Interstate Printers and Publishers, Inc. 1969, pp. 183-212.

   In this section of Hoover's book, several occupations which are available in the Agricultural Products (Food Processing) area are mentioned. The author discusses the description and nature of the work, working conditions, educational and personal qualifications, and ways to enter and advance in the industry.

HUMAN RELATIONS IN AGRICULTURAL PRODUCTS

(FOOD PROCESSING)

UNIT CONCEPT: Many jobs are lost because of poor human relations between employee, employer and supervisor. Human relations in today's society is a "two-way street" as the employee has a role or responsibility and loyalty to the employer and the employer has certain responsibilities to the employees. The human relations process focuses upon the ability to present ideas and the ability to listen as people relate to each other.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. While preparing for an occupation in agricultural products (food processing), conduct a self-evaluation of his physical appearance, speech and conversation, and personality as it relates to relations with other persons to the satisfaction of the teacher.

2. While working in a food processing occupation, improve his relations with other personnel as evaluated by the employer utilizing criteria such as appearance, punctuality, dependability, production, initiative and cooperation.

3. When meeting and working with employers, fellow employees or supervisors, communicate effectively orally or in writing with these persons to the satisfaction of the teacher and/or employer.

B. INSTRUCTIONAL AREAS

1. Determining how people fail and succeed on the job

   a. Identifying common causes of job failure

   b. Recognizing the various human needs and motives that are satisfied by occupations

   c. Recognizing how human motives and needs affect the human relations process

2. Identifying human relations roles and situations in food processing occupations

   a. Assessing the employee's role

   b. Assessing the employer's role

   c. Assessing the foreman's or supervisor's role

3. Considering factors that influence the human relations process in food processing occupations

   a. Assessing the influence of personality in human relations

      (1) Considering factors that influence personality
      (2) Controlling and improving your personality

   b. Relating with your fellow employees

      (1) Identifying feelings and attitudes that affect human relations with fellow employees
      (2) Cooperating with fellow employees to create a productive and pleasant work environment

   c. Relating with the foreman or supervisors

      (1) Improving attitudes toward supervision
      (2) Accepting criticism, advice and praise
      (3) Cooperating with supervisors in recognizing and solving problems that affect the organization

4. Developing speaking and writing skills

   a. Conducting and participating in conversations and discussions

   b. Using the telephone effectively

   c. Speaking in public

   d. Writing legibly and effectively

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. Have each student complete a self-inventory of his personality. Compare the student's ratings with the ratings of others who are inventorying his personality, such as the teacher and employer.

2. a. Have the students conduct a questionnaire survey of food processing industries to determine the major factors that resulted in persons losing their jobs during the last five years.

   b. Have a supervisor or manager from a food processing plant visit with the class to discuss the importance of establishing good human relations with fellow employees, employer, and supervisors.

3. Hold a local public speaking contest with each student giving a speech or talk concerning a facet of food processing.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Have each student conduct a self inventory of his physical appearance, speech and conversation, and personality to be used in evaluation meetings with the teacher or employer providing occupational work experience to identify personal strengths and weaknesses.

2. Have each student list eight human relations skills that are important in food processing.

3. Video tape each student as he gives a talk or speech or participants in a discussion session so that the teacher and student can evaluate his performance.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Appropriate classroom equipment such as tape recorder, telephone, and video tape equipment

2. Appropriate forms for self evaluation

F. EXAMPLES OF SUPPORTING REFERENCES

1. Course of Study in Agricultural Occupations. Lexington, Kentucky: Department of Agricultural Education, University of Kentucky. 1967, 262 pages.

This reference, which is most helpful to teachers, covers in outline form the various areas of human relations. Forms are provided which may be completed to evaluate certain aspects of human relations with fellow workers and for employer-teacher evaluation of the student.

2. Human Relations in Business. Columbus, Ohio: Ohio Agricultural Education Curriculum Materials Service, The Ohio State University. 1971, 70 pages.

   The student reference includes brief yet comprehensive discussions and exercises which the student can read and complete to obtain a better understanding of the human relations process.

3. Resource Unit on Human Relations. Tucson, Arizona: Department of Agricultural Education, The University of Arizona. 1971, 90 pages.

   An excellent reference for teachers, the complete area of human relations is covered in outline form. Numerous case problems are presented for students and teachers to consider during discussion periods. Various rating forms for self-evaluation are included which the students may complete. Sample test items are also included.

DEVELOPING LEADERSHIP THROUGH FFA

UNIT CONCEPT: Active participation in the FFA will provide the student opportunities for developing practical training in agriculture, leadership, cooperation and citizenship.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using the basic principles of leadership, identify the role of the FFA organization in agricultural products (food processing) education.

2. Using the official FFA manual, identify the history, aims and purposes and organization of the FFA on the local, state and national level.

3. By actively participating in the organization's business meetings, demonstrate the principles of parliamentary procedure as presented in Robert's Rules of Order or other acceptable references.

4. Through active participation in the organization, serve effectively as a committee member and/or chairman in planning and carrying out the chapter program of activities.

5. If elected, serve effectively as an officer in the organization by fulfilling the duties of the office to which elected.

6. Through chapter and classroom activities, develop effective public speaking skills so as to be able to make introductions, participate in conversations and prepare and deliver speeches and talks.

7. Through active participation in the FFA, develop a strong self concept and a positive attitude toward working in society as evidenced by his public and private activities.

B. INSTRUCTIONAL AREAS

1. Developing leadership

a. Purposes for attaining leadership skills

b. Types of leadership

(1) Formal leadership
(2) Informal leadership

c. Qualities of leadership

d. Styles of leadership

e. Functions of democratic leadership

f. Opportunities for developing leadership abilities

(1) Home
(2) School
(3) Community
(4) FFA

2. Determining the place of FFA in agricultural products (food processing) education

a. The values of FFA membership

b. The contribution of the FFA to the school and community

3. Determining the background of the FFA

a. Important historical facts

b. Aims and purposes

c. Colors, emblem, motto, and creed

4. Governing and financing the FFA

a. Local

b. State

c. National

5. Attaining FFA membership and degrees

a. Types of membership

b. Local, state and national degrees

6. Planning and conducting a chapter meeting

a. Identifying officer responsibilities

b. Identifying member responsibilities

c. Conducting the business meeting

7. Planning and conducting the chapter program of activities

a. Identifying areas to be included

b. Developing a program of activities

c. Carrying out the program of activities

(1) Identifying chairman responsibilities
(2) Identifying committee member responsibilities

8. Performing FFA officer duties and responsibilities

a. Identifying qualifications for local, state and national offices

b. Identifying specific duties of each officer

c. Determining general responsibilities of an officer

(1) Conducting chapter programs
(2) Participating in officer meetings
(3) Participating in leadership activities
(4) Conducting chapter meetings

9. Developing proficiency in parliamentary procedure

a. Presiding over meetings

b. Presenting motions correctly

10. Developing public speaking skills

a. Developing conversation skills

b. Making introductions

c. Preparing a speech or talk

d. Delivering a speech or talk

11. Determining responsibilities of FFA members

a. Developing personal attributes

(1) Personal appearance
(2) Proper manners
(3) Behavior in public

b. Using the FFA code of ethics

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. Analyze the qualities of recognized good leaders.

2. Attend state and/or national FFA conventions to observe the operation of the organization.

3. a. Participate in classroom study and practice of parliamentary procedure to develop parliamentary procedure skills.

b. Plan and post agenda in advance of regular chapter meetings to promote attendance and participation by all members.

c. Attend and participate in FFA meetings to develop leadership abilities.

d. Prepare for and participate in parliamentary procedure demonstrations and contests.

4. a. Accept an FFA committee assignment suited to interest and ability to develop skills in committee work.

b. Serve as a committee chairman to develop leadership skills.

c. Prepare written and oral committee reports and present them at FFA meetings to develop personal skills and to facilitate operation of the organization.

d. Participate in special training programs for committee chairmen to obtain skills in committee work.

5. a. Arrange for election of FFA officers and participate as an officer, if elected.

b. Plan, conduct and/or participate in leadership workshops or officer-training programs.

c. Establish performance standards for local FFA officers.

6. a. Participate in classroom discussions, demonstrations, oral and written reports, and local public speaking competition.

b. Enter public speaking contests above the local level.

c. Participate in leadership activities above the local level.

d. Practice making formal introductions through role playing.

e. Have each student prepare a short talk or speech to present in class, using a tape recorder or video tape for the student to hear and/or observe his performance.

7. Conduct a self-evaluation of leadership qualities, personality characteristics, and other personal attributes, identifying strong points to build upon and weak points needing improvement.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Have each student list the qualities of a democratic leader so that attainment of the qualities would result in a person displaying democratic leadership.

2. Develop a matching test in which each student would match the parts of the FFA emblem with what it symbolizes with complete accuracy.

3. Divide the class into groups to present a business meeting. The teacher should evaluate each group and member as to their poise and knowledge of parliamentary procedure.

4. Have each member assigned responsibilities for assisting in planning and conducting the chapter program of activities. Evaluate

each member in reference to completion of his assigned tasks and the improvement that he exhibits over each grading period.

5. Have the secretary, treasurer, and reporter regularly submit their books to the auditing committee and teacher for evaluation as to completeness, neatness and accuracy.

6. Conduct a public speaking contest in each class for the teacher to evaluate each student for his presentation in relation to his speaking abilities.

7. Have each student complete a personal evaluation form as to his attitudes toward himself and society. The teacher should privately discuss the personal evaluation with each student to recognize strong points and weak points needing improvement.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Official FFA paraphernalia

2. Official FFA secretary's and treasurer's books

3. Official FFA scrapbook

4. Tape recorder or video tape

F. EXAMPLES OF SUPPORTING REFERENCES

1. Bender, Ralph E. The FFA and You. Danville, Illinois: The Interstate Printers and Publishers, Inc. 1962, 494 pages.

   This text covers all areas of FFA program activities as well as officer and member duties and responsibilities. It is an excellent reference for beginning members and officers.

2. Newcomb, L. H. Membership - Pathway to Leadership. Columbus, Ohio: Ohio Agricultural Education Curriculum Materials Service, The Ohio State University. 1972, 23 pages.

   An aid for teacher unit planning and for the student, this booklet emphasizes fundamental leadership competencies to be developed by all members.

3. Official Manual, Future Farmers of America. Alexandria, Virginia: Future Farmers Supply Service. 1972, 128 pages.

This manual will assist both members and advisors in gaining an understanding of the history, organization, and operation of the FFA

4. Stewart, W. F. Helps in Mastering Parliamentary Procedure. Columbus, Ohio: Ohio Agricultural Education Curriculum Materials Service, The Ohio State University. 1969, 17 pages.

A simple and easily understood booklet containing the basic rules of parliamentary procedure. It also includes a quick reference chart with requirements for each type of motion.

GROOMING ESSENTIALS AND THE USE OF HYGIENIC PRACTICES IN PROCESSING FOOD PRODUCTS

UNIT CONCEPT: Food processing personnel must keep themselves clean and use clean working habits to reduce the likelihood of product contamination.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Dress and groom himself or herself well enough that product sanitation is preserved and meets the requirements of the plant or employer.

2. When working in facilities of a food processing plant and/or comparable facilities in the school laboratory, use hygienic practices which meet or exceed plant sanitation standards as well as local, state and federal public self-health standards.

B. INSTRUCTIONAL AREAS

1. Determining reasons for good grooming

   a. Promoting sanitary conditions for products

   b. Personal appearance

   c. Well being of the person

2. Performing good grooming essentials

   a. Taking showers and baths

      (1) Determining when and how often to shower or bathe
      (2) Selecting soaps
      (3) Scrubbing and rinsing procedures

   b. Shaving

(1) Scheduling time for shaving
(2) Selecting shaving creams
(3) Selecting type of shaving equipment
(4) Shaving parts of the body
(5) Selecting after-shave lotions

c. Using deodorants and anti-perspirants

(1) Determining the differences in deodorants and anti-perspirants
(2) Selecting deodorants and anti-perspirants
(3) Frequency and methods of applying deodorants and anti-perspirants

d. Conditioning the hair

(1) Selecting the shampoo for washing
(2) Scheduling times for shampooing
(3) Applying and rinsing shampoo
(4) Selecting grease and oils
(5) Selecting combs and brushes
(6) Methods and frequency of combing and brushing the hair

e. Brushing teeth

(1) Selecting toothbrush
(2) Selecting toothpaste
(3) Techniques for brushing the teeth
(4) Frequency and time for brushing the teeth

f. Rinsing the mouth after brushing

(1) Selecting the mouthwash
(2) Technique for rinsing the mouth

g. Cleaning and caring for the hands

(1) Selecting soaps for washing
(2) Removing dirt from fingernails
(3) Scrubbing procedure to remove dirt from hands
(4) Rinsing hands
(5) Sanitizing hands
(6) Selecting and using lotions to soften hands

3. Using hygienic practices to prevent product contamination

   a. Wearing clean clothes according to plant directions

   b. Wearing clean shoes or boots

   c. Covering hair according to plant requirements

   d. Removing jewelry

   e. Keeping hands away from mouth, nose and hair

   f. Keeping work area clean and sanitized

   g. Cleaning, rinsing and sanitizing equipment according to plant requirements

   h. Washing hands as often as required, especially after use of toilet

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. Have students wash hands by using correct hand washing techniques.

2. Have students place clean white paper on tables and have one student demonstrate what would occur if the hand was rubbed against the hair.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. The teacher should check the student against a list of factors which are considered to be good grooming traits. Conduct a daily and weekly check over a period of time to determine if improvements are being made in areas where the student was deficient.

2. The teacher or supervisor should indicate to the students that over a two week time span each student will be evaluated for a three day period without his knowledge on the following points:

   a. Wearing clean clothes during the day

   b. Wearing hair nets or hard hats

c. Wearing clean shoes or boots

d. Keeping hands away from mouth, nose and hair

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Food processing equipment and facilities in a plant and/or comparable facilities and equipment in the school laboratory

2. Various types of soaps for body cleaning

3. Razor, electric shaver, shaving cream, after-shave lotions

4. Various types of deodorants and anti-perspirants

5. Hair combs and brushes, various types of hair shampoo

6. Toothbrushes and toothpaste, various types of mouthwash

7. Hand lotion

8. Food processing clothes, boots and shoes, hard hats

F. EXAMPLES OF SUPPORTING REFERENCES

1. Clean Hands. FDA 72-2031. Washington, D.C.: Public Health Service, Food and Drug Administration, U.S. Department of Health, Education and Welfare, U.S. Government Printing Office. 13 pages.

   This booklet covers the importance of washing hands and the proper way to do it. Black and white pictures are included to assist in explaining the concepts.

2. Shannon, Theodore. Taking Care of Yourself. Columbus, Ohio: Ohio Agricultural Education Curriculum Materials Service, The Ohio State University. 1972, 27 pages.

   This reference covers the basic concepts used for keeping oneself clean and attractive. The book was written mainly for vocational students and has illustrations to assist students in understanding the various learning areas.

3. So You Work in a Food Plant. FDA 72-2032. Washington, D.C.: Public Health Service, Food and Drug Administration, U.S. Department of Health, Education and Welfare, U.S. Government Printing Office. 12 pages.

This booklet briefly covers the importance of using good work habits in working in food plants to prevent product contamination.

4. Training Food Service Personnel for the Hospitality Industry. Washington, D.C.: Office of Education, U.S. Department of Health, Education and Welfare, U.S. Government Printing Office. 1969, pp. 46-48.

   This reference discusses briefly the basic concepts involved in good grooming.

INSECT AND RODENT CONTROL IN FOOD PROCESSING PLANTS

UNIT CONCEPT: Insects and rodents must be controlled in food processing plants because they damage products and facilities and are capable of transmitting a number of diseases to man through contamination of food.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using facilities in a food processing plant and/or comparable facilities in the school laboratory, identify possible areas where insects and rodents might locate and multiply so that insecticides and rodenticides can be applied for control purposes.

2. Using insecticide and rodenticide applicators, apply insecticides and rodenticides approved by the Public Health Service and/or registered with the U.S. Department of Agriculture, according to the manufacturer's directions.

B. INSTRUCTIONAL AREAS

1. Identifying areas where insects can locate and multiply

   a. Checking the following areas in the food processing plant for insects and/or rodents:

      (1) Walls
      (2) Floors
      (3) Ceilings
      (4) Dressing rooms and lockers
      (5) Lunch rooms
      (6) Equipment
      (7) Rest rooms
      (8) Storage rooms

   b. Checking the following areas around the food processing plant:

(1) Garbage dumps
(2) Temporary outside storage areas
(3) Plant entrance

2. Determining types of insecticides and rodenticides

a. Identifying the characteristics of fumigants used for controlling insects and rodents

(1) Hydrocyanic acid gas
(2) Methyl bromide gas

b. Identifying the characteristics of insect sprays used for controlling insects

(1) Organic thiocyanates
(2) Chordane
(3) Lindane
(4) Malathion
(5) Pyrethrin
(6) Allethrin
(7) Diazion
(8) Dipterex
(9) Piperonyl butoxide
(10) N-propyl isome
(11) N-octyl dicycloheptane dicarboximide
(12) Methoxychlor

c. Identifying the characteristics of insect powders used for controlling insects

(1) Sodium fluoride
(2) Powdered pyrethrum
(3) Rotenone
(4) Borax and boric acid
(5) Organic thiocyanates

d. Identifying the characteristics of rodent baits used for controlling rodents

(1) Anticoagulants
(2) Red squill
(3) Tracking powders and sticky boards

3. Controlling insects and rodents

   a. Using sprays

      (1) Determining where to spray
      (2) Protecting products
      (3) Protecting workers
      (4) Selecting, measuring and mixing chemicals according to manufacturer's directions
      (5) Adjusting applicator
      (6) Filling applicator
      (7) Applying sprays
      (8) Lubricating applicator
      (9) Cleaning and storing pest control equipment
      (10) Checking spray areas to determine if application was effective
      (11) Keeping records on spraying operations

   b. Using baits

      (1) Determining where to place bait and bait containers
      (2) Selecting and measuring dry bait and filling containers
      (3) Selecting, measuring and mixing liquid baits and filling containers
      (4) Checking bait containers to determine effect of control
      (5) Re-filling bait containers

   c. Using fumigants

      (1) Selecting fumigants
      (2) Adjusting applicator
      (3) Protecting workers
      (4) Protecting food products
      (5) Closing windows and doors to prevent air from entering
      (6) Applying fumigants according to manufacturer's directions and plant demands
      (7) Checking fumigation room to determine the effects of plant fumigation
      (8) Ventilating the rooms after fumigation

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. Visit a food processing plant and have a plant supervisor explain to students the essence of the plant's insect and rodent control

program. After the supervisor completes the explanation, the students should locate areas where insects and rodents are nesting.

2. a. Have the students measure and mix insecticides according to manufacturer's directions.

   b. Have students calibrate a manual chemical applicator according to specifications recommended by the teacher.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Have students list five areas where insects are usually located and explain the conditions which cause them to multiply in food processing plants.

2. Have students apply insecticides according to manufacturer's directions and the directions of the teacher and/or supervisor. The teacher and/or supervisor should evaluate the student on his ability to adjust the applicator and techniques used for applying.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Food processing plant and/or comparable facilities in the school laboratory

2. Various types of insecticides and rodenticides

3. Insecticide and rodenticide applicators

4. Respirator

5. Gas mask

6. Protective clothing, rubber gloves, rubber boots

F. EXAMPLES OF SUPPORTING REFERENCES

1. Fridline, Clarence R. Insecticides - Kinds, Formulations, Mixing, and Applying. Columbus, Ohio: Ohio Agricultural Education Curriculum Materials Service, The Ohio State University. 1973, 65 pages.

This reference includes basic information on the kinds, formulations, mixing, and applications of insecticides. This material was written mainly for vocational students and is easily comprehended due to the level of writing by the author and the inclusion of illustrations and pictures.

2. Sanitation Handbook of Meat and Poultry Inspection Programs. Washington, D.C.: Animal and Plant Health Inspection Service, U.S. Department of Agriculture. 1972, pp. 51-56.

This section of the reference briefly discusses the basic knowledge needed for controlling insects and rodents in meat processing plants.

CLEANING AND SANITIZING CHEMICALS USED IN FOOD PROCESSING PLANTS

UNIT CONCEPT: Food processing equipment must be cleaned and sanitized according to local, state and federal standards to assist in maintaining the keeping quality of food products.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. When given a cleaning or sanitizing job, select the correct materials for the job of cleaning and sanitizing food processing equipment according to plant standards as well as local, state and federal Public Health Service standards.

B. INSTRUCTIONAL AREAS

1. The types of food processing equipment cleaners

   a. Determining cleaning characteristics of alkali cleaners

      (1) Caustic soda
      (2) Soda ash
      (3) Sesquicuhonate
      (4) Trisodium phosphate
      (5) Sodium melasticate

   b. Determining cleaning characteristics of acid cleaners

      (1) Phosphoric
      (2) Tartaric
      (3) Citric
      (4) Gluconic
      (5) Hydroxyacetic

   c. Determining cleaning characteristics of polyphosphate cleaners

      (1) Sodium hexameta-phosphate
      (2) Sodium tetrameta-phosphate

d. Determining cleaning characteristics of wetting agents

(1) Anionic
(2) Nonionic
(3) Cationic

2. The types of food processing equipment sanitizers

a. Determining effectiveness of chlorine solutions

(1) Length of time chlorine solutions are effective after the solution has come into contact with equipment
(2) Required water temperature for effective sanitizing
(3) Length of time chlorine solution should remain in contact with equipment
(4) Determining sanitizing capability of chlorine solutions when mixed according to manufacturer's directions

b. Determining sanitizing characteristics of iodine compounds

(1) Iodaphor
(2) Chloramine t-potassium iodide

c. Determining bactericidal effectiveness of quaternary ammonium compounds

(1) Chemical nature and concentration of the active agent
(2) Temperature of application
(3) pH
(4) Exposure time
(5) Interfering substances in natural waters

3. Identifying various types of brushes used for cleaning and sanitizing food processing equipment

a. Determining reasons for using various types of brushes in food processing plants

(1) Costs
(2) Ease of handling when cleaning and sanitizing
(3) Effectiveness of cleaning and sanitizing equipment
(4) Ease of cleaning brushes after cleaning and sanitizing equipment in processing plant
(5) Durability of brushes

b. The wood types

(1) Shape of handles and arrangement of brush needles
(2) Lengths

c. The plastic types

(1) Shape of handles and arrangement of brush needles
(2) Lengths

4. Identifying various types of buckets used in cleaning and sanitizing food processing equipment

a. Determining reasons for using various types of buckets in food processing plants

(1) Costs
(2) Durability
(3) Ease of cleaning after cleaning and sanitizing equipment
(4) Protection of equipment when bucket comes into contact with equipment

b. The metal types

(1) Volume sizes
(2) Shapes

c. The rubber types

(1) Volume sizes
(2) Shapes

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. a. Visit a food processing equipment supplier and have the manager or salesman explain to students the uses of various food processing equipment cleaners and sanitizers.

b. Obtain several types of food processing equipment cleaning solutions from a food processing equipment supplier and have students measure and mix the solutions according to manufacturer's recommendations.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. a. Given several types of food processing alkali cleaning solutions, the students should be able to explain uses of the alkali cleaners in a written examination.

   b. Students should be able to list three factors which cause chlorine solutions to be most effective in sanitizing food processing equipment.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Various types of food processing cleaning detergents
2. Various types of food processing sanitizers
3. Hard hats, rubber boots, hair nets
4. Plastic pails, metal pails
5. Wood brushes, plastic brushes

F. EXAMPLES OF SUPPORTING REFERENCES

1. Fish Handling and Processing. New York, New York: Chemical Publishing Company, Inc. 1967, pp. 66-69.

   The author discusses briefly the use of cleaning detergents and sterilizers in fish processing plants.

2. Henderson, James Lloyd. The Fluid-Milk Industry. Westport, Connecticut: The AVI Publishing Company, Inc. 1971, pp. 298-331.

   This section of Henderson's book includes basic concepts for understanding the uses of cleaners and sanitizers in the milk industry.

3. Mountney, George J. Poultry Products Technology. Westport, Connecticut: The AVI Publishing Company, Inc. 1966, pp. 117-119.

   Mountney discusses briefly the use of cleaning detergents and sanitizers in poultry processing plants.

THE USE OF FOOD PROCESSING LABELING EQUIPMENT

UNIT CONCEPT: An attractive label with accurate data about the type, quantity and quality of canned or packaged content is not only necessary in order to meet governmental standards, but is important in helping the customer make purchasing decisions and adding in sales appeal.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Given commonly used labeling equipment and specific types of food products to be labeled, the student will be able to operate labeling equipment and make necessary adjustments as the product, package or container changes.

2. Given proper lubrication materials and commonly used lubricating tools and equipment, repairing tools and materials, the student will be able to lubricate and make minor repairs on commonly used labeling equipment according to operators' manuals.

B. INSTRUCTIONAL AREAS

1. Types and functions of labeling equipment

   a. Identifying types of labeling equipment

   b. Identifying basic operating features of various types of labeling equipment

   c. Identifying major parts and their functions

2. Adjusting and operating labeling equipment

   a. Identifying parts requiring adjustments

   b. Determining when adjustments are needed and checking adjustments

c. Selecting tools and equipment

d. Determining products to be labeled, and type of container or package

e. Adding labeling materials (glue, labels, etc.) to equipment

f. Adjusting and checking equipment for desired labeling

g. Using the controls

h. Preventing damage to products

i. Preventing injuries to workers

j. Preventing damage to equipment

3. Lubricating and making minor repairs on labeling equipment

a. Selecting grease and oils according to manufacturer's specifications

b. Identifying parts requiring grease and oils

c. Using correct greasing procedures according to operator's manual

d. Determining a lubrication schedule according to the operation

(1) Using servicing records
(2) Using service manuals

e. Servicing specified systems and/or parts according to manufacturer's specifications

f. Checking all visible parts for malfunctions or wear

g. Making minor repairs with appropriate tools

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. a. Take field trips to different types of food processing plants and have plant managers or supervisors explain and demonstrate the operation of different types of labeling equipment.

b. Label food products according to plant specifications with labeling equipment.

c. Adjust and check equipment for desired labeling of packages or containers.

2. Grease and oil labeling equipment with appropriate lubricants and lubricating equipment.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Given commonly used labeling equipment and specific types of food products to be labeled, the student must be able to operate labeling equipment and make necessary adjustments as product, package or container changes so that labels are put on containers according to plant standards as well as state and federal specifications.

2. Given proper lubrication materials and commonly used lubricating tools and equipment, the student must be able to lubricate labeling equipment according to operator's manual.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Food processing school laboratory with food processing labeling equipment

2. Food processing plant training stations

3. Various types of packaged and canned products

4. Visual check sheets and service charts

5. Lubricating equipment

6. Hard hats and rubber boots

F. EXAMPLES OF SUPPORTING REFERENCES

1. The Canning Industry. Washington, D.C.: Communication Services, National Canners Association. 1971, 56 pages.

In this reference, the National Canners Association provides a general overview in terms of the history, importance, organization, methods, and the public service values of the products which come from the canning industry.

2. Joslyn, Maynard A. and Heid, J. L. Food Processing Operations - Their Management, Machines, Materials, and Methods. Westport, Connecticut: The AVI Publishing Company, Inc. 1963, 644 pages.

All aspects of processing fruits and vegetables are discussed in this reference.

STORING FOOD PRODUCTS

UNIT CONCEPT: Food products must be properly stored to prevent damages causes by temperature, humidity, equipment, rodents, insects or other pests. Properly stored food products will assist in providing the consumer with a high quality product over the longest possible marketing period.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using a fork lift truck, stack and/or store food products according to plant specifications and care for the stacking and storing equipment.

2. Placed in a food processing plant warehouse or storage area, regulate storage environment so that food product quality is maintained.

3. Placed in a food processing plant warehouse or storage area with specific types of food products, take inventory of the products to assist in increasing processing and/or shipping efficiency.

B. INSTRUCTIONAL AREAS

1. Stacking or storing food products

   a. Features and operating characteristics of various types of fork lift trucks

      (1) Electric fork truck
      (2) Gasoline fork truck
      (3) High flotation fork truck
      (4) High lift fork lift truck
      (5) Straddle or reach-out type fork lift truck
      (6) Tiering truck
      (7) Powered low-lift pallet truck
      (8) Hand pallet truck

   b. Features and operating characteristics of various types of conveyors

(1) Gravity conveyors
(2) Belt and line roll conveyors
(3) Chain or trolley conveyors

c. Designs of wooden pallets and their use

(1) The two-way entry
(2) The four-way entry

d. Features of various pallet patterns

(1) Block
(2) Split block
(3) Brick
(4) Row
(5) Split row
(6) Pinwheel
(7) Split pinwheel

e. Storing food products to assure maximum utilization of space

(1) Type of product to be stored and essential environmental conditions
(2) Ceiling or clear storage heights
(3) Load height
(4) Length of storage area
(5) Width of storage area
(6) Load weight
(7) Floor space
(8) Obstructions in storage area

f. Arranging food products in desired location

(1) Placing products
(2) Preventing injuries to workers
(3) Preventing damages to products and equipment

2. Care and maintenance of fork lift trucks and conveyors

a. Selecting grease and oils

b. Identifying parts requiring grease and oils

c. Using correct greasing procedures according to operator's manual

d. Determining a lubrication schedule according to the operation

(1) Using servicing records
(2) Using servicing manuals

e. Servicing specified systems and/or parts according to manufacturer's specifications

f. Checking all visible parts for malfunctions or wear

3. Controlling storage conditions for protecting various types of food products

a. Temperature

b. Humidity

c. Lighting

d. Ventilation

4. Inventorying stored food products

a. Identifying forms used in inventorying various types of food products

b. Taking the physical inventory and recording the information needed on appropriate forms

(1) Identifying types of stored food products
(2) Identifying container sizes

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. a. Have students use an electric-powered fork lift truck and/or any available fork lift truck to move a pallet of empty boxes from one area in the warehouse to another.

b. Have students grease and oil conveyors with appropriate lubricants and lubricating equipment.

2. Take a field trip to a local storage area and warehouse and have students identify and explain the importance of specific environmental conditions (temperature, humidity) needed to assist in assuring quality storage for specific types of food products.

3. Visit a local food products warehouse and have students take a physical inventory using the appropriate form, paying attention to the condition and total count of each item.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Using a fork lift truck, the student should be able to stack food products so that they are properly arranged and secured according to standards established by the teacher or supervisor.

2. The student should be able to adjust the temperature in a food products storage area or warehouse so that food product quality is maintained.

3. Given various types of food products in a storage area or warehouse, the student must be able to take inventory of the products so that each item in the area is accounted for.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Food products storage and/or food warehouse training stations

2. Various types of raw and processed food products

3. Food products inventory sheets

4. Equipment visual check sheets, service charts, lubricating equipment

5. Fork lift trucks

6. Conveyors

7. Pallets

8. Hard hats and rubber boots

F. EXAMPLES OF SUPPORTING REFERENCES

1. Agricultural Products: Student Study Guide and Answer Book. Montgomery, Alabama: Agricultural Education Service, State Department of Education. 182 pages.

These two references include basic information pertinent to storing and warehousing of agricultural products.

2. Briggs, Andrew J. Warehouse Operations Planning and Management. New York, New York: John Wiley and Sons. 1960, 303 pages.

This reference includes information on warehouse operation planning and management. Pictures and illustrations are included to assist the reader in comprehending the material. It is an excellent student reference.

SHIPPING PROCESSED FOOD PRODUCTS

UNIT CONCEPT: Processed food products must be properly shipped to prescribed destinations so that they are safe for consumption and are available for consumers when desired.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Working in the shipping department of a food processing plant or school laboratory with comparable facilities, collect and organize items according to shipping orders so that they are ready to be arranged on transportation vehicles when needed.

2. Given processed food products which have been arranged according to shipping orders, manually and mechanically arrange products on transportation vehicles (trucks, railroad cars, etc.) so that they are not damaged while being transported.

B. INSTRUCTIONAL AREAS

1. Collecting items to be shipped

   a. Reading and interpreting shipping orders

   b. Determining sizes and volumes of product containers

   c. Handling products

      (1) Using push trucks or carts

         (a) Locating desired products
         (b) Stacking products on push trucks or carts
         (c) Checking off products collected on the shipping order
         (d) Re-stacking stacks where items are collected to prevent them from falling
         (e) Stacking collected items in desired location for loading on transportation vehicles

(f) Preventing damage of processed products

(2) Using fork lifts in handling products

(a) Locating desired product
(b) Securing stacked products before removing with fork lifts
(c) Removing stacked products from storage area

1. Preventing damage to products
2. Preventing injuries to workers
3. Preventing damage to fork lift

(d) Counting number of containers in stacks and checking off products collected on the shipping order
(e) Securing stacks where items are removed to prevent them from falling
(f) Stacking collected items in desired location for loading on transportation vehicles

(3) Using conveyors in handling products

(a) Locating desired products
(b) Placing conveyor in area where products are to be collected
(c) Checking to see that items are stopped at desired area where they are to be unloaded from the conveyor
(d) Placing products on conveyor
(e) Checking off products collected on the shipping order
(f) Re-stacking stacks where items are collected to prevent them from falling
(g) Removing items from conveyors and stacking them in desired location for loading on transportation vehicles
(h) Preventing damage to products
(i) Preventing injuries to workers

2. Loading food products on transportation vehicles

a. Using push trucks or carts in loading food products

(1) Placing transportation vehicles near loading dock area for ease of handling

(2) Locating desired products and checking the shipping order for correct number of items
(3) Placing items on push trucks or carts
(4) Stacking products on transportation vehicle
(5) Securing each stack in the vehicle
(6) Preventing damage to products
(7) Preventing injuries to workers

b. Using fork lifts in loading products

(1) Placing transportation vehicle near loading dock area for ease of handling
(2) Locating desired products and checking the shipping order for correct number of items
(3) Removing products from arranged stacks
(4) Stacking products on transportation vehicle
(5) Securing each stack in the transportation vehicle
(6) Preventing damage to products
(7) Preventing injuries to workers

c. Using conveyors in loading food products

(1) Placing transportation vehicle near loading dock area ease of handling
(2) Placing conveyor system near the area where products have been prepared for loading and in the transportation vehicle
(3) Checking the shipping order for correct number of items
(4) Placing items on conveyor system
(5) Removing products from conveyor system and stacking products on transportation vehicle
(6) Securing each stack in the transportation vehicle
(7) Preventing damage to products
(8) Preventing injuries to workers

3. Closing out the shipping process

a. Checking the shipping order to see that desired products have been loaded

b. Checking the temperature of the transportation vehicle so that products will not spoil or lose their keeping quality

c. Removing push carts, conveyors and other items used in loading

d. Closing and securing all doors to the transportation vehicle

e. Removing transportation vehicle from loading dock area

f. Cleaning and washing down shipping area

4. General care and maintenance of food processing shipping equipment

a. The push carts and push trucks

(1) Checking wheels for ease of operation
(2) Selecting grease
(3) Greasing wheels when needed
(4) Storing when shipping operation is completed

b. The fork lift

(1) Selecting grease and oils
(2) Identifying parts requiring grease and oils
(3) Greasing and oiling parts according to operator's manual
(4) Using servicing manuals
(5) Checking visible parts for malfunctions
(6) Storing when shipping operation is completed

c. The conveyor system

(1) Selecting grease and oils
(2) Identifying parts requiring grease and oils
(3) Greasing and oiling parts according to operator's manual
(4) Using service manuals
(5) Checking visible parts for malfunction
(6) Storing when shipping operation is completed

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. a. Obtain various sizes of paper boxes from a grocery store and have students practice stacking boxes in a given area.

b. Use the products and equipment in a food processing plant (dairy, fruits and vegetables, etc.) shipping department and have students fill several orders with the use of a push truck.

2. Have students stack empty boxes on wood pallets and then practice moving the loaded pallets with the use of a fork lift from one area to another.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Working in the shipping department of a food processing plant or school laboratory with comparable facilities, students should fill several orders given to them by the teacher or cooperating supervisor. The teacher or cooperating supervisor should evaluate the student on his ability to collect the correct size and number of items according to shipping orders. The student should also be evaluated on his ability to stack orders on the push truck so that they are not damaged.

2. Using a fork lift, the student must be able to remove processed food products from a given storage area and properly stack the products on a transportation vehicle (truck, railroad car, etc.) without damaging the product, the transportation vehicle, or the fork lift, or injuring workers.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Processed food products (dairy, fruits and vegetables, etc.)

2. Fork lift, push carts, push trucks, conveyor system used for loading food products

3. Transportation vehicles (trucks, railroad cars, etc.)

4. Hard hats and rubber boots

5. Greasing and oiling equipment

6. Empty paper boxes

F. EXAMPLES OF SUPPORTING REFERENCES

1. Agricultural Products: Student Study Guide and Answer Book. Montgomery, Alabama: Agricultural Education Service, State Department of Education. 182 pages.

These two references discuss briefly aspects in shipping and handling of agricultural products.

2. Fowler, Stewart H. The Marketing of Livestock and Meat. Danville, Illinois: The Interstate Printers and Publishers, Inc. 1961, pp. 669-681.

In this section, Fowler discusses the transporting of processed meat and meat products.

II

MEAT, FISH, POULTRY

U.S.O.E. CODE 01.04 01 01 00

Displaying Meat Products

Units Specific to Beef, Veal, Lamb and Pork Meat Processing

Units Specific to Fish Processing

Units Specific to Poultry Processing

DISPLAYING MEAT PRODUCTS

UNIT CONCEPT: Properly prepared and attractively displayed meat cuts promote consumer purchases as well as extend the keeping quality of the product.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using the facilities of a commercial meat cutting department and/or comparable facilities in the school meat laboratory, select appropriate tools and trim the retail meat cuts accurately within a time period acceptable for entry level employment in the retail meat industry.

2. Using trimmed retail meat cuts and variety parts, select appropriate containers and/or trays and properly arrange the products so that they are attractive to the consumer.

3. Given various types of retail meat cuts (lamb, fish, poultry, beef, veal) and scales for weighing meat products, adjust scales according to prescribed price per pound for specific products and accurately weigh the meat cuts within a time period acceptable for entry level employment in the meat industry.

4. Given various types of retail meat cuts and meat wrapping equipment, properly wrap the cuts of meat so that they are not exposed to air.

5. Given various types of retail meat cuts to be displayed in meat counters, properly arrange them so that they are attractive to consumers and the displaying techniques are acceptable for entry level employment in the meat industry.

B. INSTRUCTIONAL AREAS

1. Determining and selecting types of tools for trimming various types of retail meat cuts

2. Trimming various types of retail cuts

a. Leaving prescribed margin of fat

b. Clipping bones

c. Making smooth cuts

d. Removing large amounts of internal fat

e. Changing position of meat products and changing style of cuts for added customer interest

3. Selecting containers and/or trays and arranging various types of meat retail cuts

a. Considering product size and shape for selecting containers or trays

b. Placing meat cuts in containers

c. Placing meat cuts on trays

4. Adjusting the scales for weighing retail cuts

a. Weighing containers or trays before selecting prescribed product price per pound

b. Selecting and adjusting scales to prescribed product price per pound

c. Weighing various retail cuts from various types of livestock carcasses

d. Keeping records of meat products weighed

5. Wrapping various types of retail cuts

a. Identifying operating features of meat wrapping equipment

b. Operating meat wrapping equipment

(1) Putting wrapping paper in the equipment
(2) Wrapping meat products and checking products for proper sealing

c. Labeling packages with correct weight and price per pound

6. Arranging various types of retail cuts of meat

   a. Organizing and placing products into sections in counters

   b. Keeping counters clean

   c. Changing product arrangement periodically in counters

   d. Placing price per pound tags on meat products in meat counters

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. Using the school meat laboratory or a commercial meat retail department, divide the class into groups of three. Each student in the group should be given several retail cuts from the round of a beef carcass and, selecting appropriate tools, should properly trim the cuts. The students in the group should evaluate each other and the other members of the class as well on tool selection, trimming accuracy and time taken for trimming.

2. Divide the students into groups of three. Each student in the group should be given variety cuts from a pork carcass and, selecting appropriate containers and trays, should properly arrange them. The students in the group should evaluate each other as well as the other members of the class on container selection, proper arrangement and time taken for arranging.

3. Divide the students into groups of three. Each student in the group should be given a variety of meat cuts from a fryer and, adjusting meat scales according to prescribed price per pound for individual cuts, weigh each cut. The students in the group should evaluate each other and the other members of the class on scale adjustments, weighing techniques, and time taken for adjusting and weighing the individual fryer parts.

4. Divide the students into groups of three. Each student should be given several fresh fish products and should wrap each item with the use of meat wrapping equipment. The students should evaluate each other and the rest of the class on tightness of the finished wrapped product and time taken for wrapping.

5. Using the school meat lab meat counter or a meat counter in a commercial meat department, divide the class into groups of three.

Each group should properly arrange in the counter a variety of meat cuts from different animals (fryer breasts, legs, and thighs; pork loin roast, liver, and chuck steaks; different types of fish products; veal rib chops; loin roast; crown roast; beef ribs, fresh briskets and beef stew; and others). The teacher and/or supervisor should evaluate each group's display on overall appearance, arrangement of individual meat cuts, cleanliness of the counter, and similar considerations.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Use facilities of a commercial meat cutting department and/or comparable facilities in the school meat laboratory stocked with appropriate tools for trimming livestock meat cuts, and several retail meat cuts from the round to be trimmed for display. The student must be capable of selecting tools and properly trimming the retail cuts with a high degree of competency. The teacher or cooperating supervisor must evaluate the student for tool selection, accuracy in trimming and amount of time needed for trimming based on entry level skills needed for entering the retail meat industry.

2. Each student should be proficient in selecting appropriate containers or trays and properly arranging different types of fresh fish or meat products. The teacher or cooperating supervisor (co-op programs) should evaluate the student for container or tray selection, attractiveness of arrangement and amount of time needed for arranging the products based on entry level skills needed for entering the fresh fish or meat retail industry.

3. The teacher or cooperating supervisor should evaluate each student on accurate adjustments of scale, proper weighing techniques and amount of time needed for adjusting and weighing meat cuts based on entry level skills needed for entering the meat industry.

4. Given a variety of retail meat cuts (beef, lamb, pork, fish, and others) to be wrapped with meat wrapping equipment, each student should be proficient in wrapping all cuts. The teacher or supervisor should evaluate the students on tightness of wrap and time taken to wrap individual cuts based on entry level skills needed for entering the meat industry.

5. Given a total of twenty variety retail meat cuts from different meat animals to be displayed in a meat counter, each student must be

proficient in properly arranging the products. The teacher or supervisor should evaluate the students on the counter's overall appearance, arrangement of the meat cuts, and other points, based on entry level skills needed for entering the meat industry.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Facilities of a commercial meat cutting department and/or comparable facilities in the school meat laboratory

2. Pork retail meat cuts and variety parts; beef retail meat cuts and variety parts; lamb retail meat cuts and variety parts; veal retail meat cuts and variety parts; poultry retail meat cuts and variety parts; various kinds of fish

3. Meat cutting hand tools: sharpening stone, block brush, metal cutting tables, butcher knives

4. Containers for packaging meat products

5. Meat wrapping paper, meat wrapping equipment

6. Meat scales

7. Meat counters

8. Hard hats, aprons, rubber boots

F. EXAMPLES OF SUPPORTING REFERENCES

1. The Sales Promotion Handbook. Chicago, Illinois: Dartnell Corporation. 1955, pp. 471-503.

   This section of the reference includes display and promotion techniques used in selling agricultural products.

UNITS SPECIFIC TO BEEF, VEAL, LAMB AND PORK MEAT PROCESSING

Handling Livestock at the Meat Processing Plant

Stunning, Shackling and Bleeding Livestock

Preparing Livestock Carcasses for the Cooler After Bleeding

Identifying, Classifying and Grading Livestock Carcasses

Cleaning and Sanitizing Tools and Equipment Used for Cutting Wholesale and Retail Meat Cuts

Identifying and Cutting Wholesale and Retail Beef Cuts

Identifying and Cutting Wholesale and Retail Veal Meat Cuts

Identifying and Cutting Wholesale and Retail Lamb or Mutton Meat Cuts

Removing the Hair on Swine Carcasses

Identifying and Cutting Wholesale and Retail Pork Cuts

HANDLING LIVESTOCK

AT THE MEAT PROCESSING PLANT

UNIT CONCEPT: Plant handling procedures are important in maintaining high grade, quality meat products, and aid in an orderly movement of the livestock.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using the facilities of a livestock meat processing plant or comparable facilities in the school meat laboratory, handle and move various types of livestock from the receiving station to the holding pens or slaughtering area so that the animal's body weight loss is minimal, injuries are prevented, and the animals are ready for slaughtering when needed.

2. Properly clean and disinfect holding pens so that plant sanitation requirements are met in addition to local, state and federal sanitation standards.

B. INSTRUCTIONAL AREAS

1. Handling livestock at the meat processing plant

   a. Use of gates to direct animal movement

   b. Equipment and processes to control animal movement

   c. Preventing injuries to animals

   d. Preventing injuries to workers

   e. Preventing damage to equipment

2. Providing feed and water for animals being held in pens

   a. Cleaning and maintaining watering equipment

b. Feeding livestock hay according to plant requirements

3. Cleaning and sanitizing holding pens

a. Preparing holding pens for washing and disinfecting

(1) Cleaning out bedding and waste material
(2) Checking areas for proper drainage

b. Washing down holding pens

(1) Using water hoses for washing and rinsing
(2) Using brooms and scraping equipment
(3) Care and storage of hoses and cleaning equipment

c. Selecting the disinfectants used in livestock holding pens

(1) Types of disinfectants
(2) Characteristics of disinfectants

d. Disinfecting holding pens

(1) Measuring and mixing disinfectants according to manufacturer's directions
(2) Applying disinfectants to areas in the holding pens

(a) Preventing contamination of watering and feeding areas
(b) Protecting other workers

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. Visit a local livestock farm and/or livestock meat processing plant and have the students move four slaughter beef animals from one location to another.

2. Visit a local farm supply store and have the supervisor explain the uses of disinfectants and demonstrate how they could be harmful to humans and animals.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Given various types of livestock to be slaughtered, the student must move livestock from the holding pens to other areas in the processing plant. The teacher should evaluate the student on his efficiency in moving the animals from one area to another with a minimum of animal stress and bodily injuries.

2. Using water hoses and cleaning equipment, the student must be able to clean a livestock holding pen in a manner that meets the standards established by the teacher or supervisor.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Livestock meat processing plant, stockyards and/or local livestock farms, comparable facilities in the school meat laboratory

2. Various types of livestock

3. Cleansers, disinfectants, brushes and pails

4. Hard hats and rubber boots

F. EXAMPLES OF SUPPORTING REFERENCES

1. Fowler, Stewart H. The Marketing of Livestock and Meat. Danville, Illinois: The Interstate Printers and Publishers, Inc. 1961, pp. 498-520.

   In this section of the book, Fowler discusses livestock losses caused by bruising, death, and crippling. The author points out the importance of handling livestock with care.

STUNNING, SHACKLING AND BLEEDING LIVESTOCK

UNIT CONCEPT: Stunning, shackling and bleeding livestock are the first steps in processing. They must be performed correctly in order to provide a more efficient meat processing operation and a more attractive product for the consumer.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using the school meat laboratory or livestock meat processing plant and given livestock to be stunned, identify and select and apply stunning techniques so that animals are stunned quickly, thoroughly, and with minimum damage to the head.

2. Given livestock to be shackled, shackle livestock to facilitate skinning or scalding processes.

3. With shackled livestock to be bled, bleed animals so that blood is quickly and thoroughly removed from the carcass.

4. Clean and sanitize shackling and bleeding equipment to meet plant sanitation requirements in addition to local, state and federal sanitation standards.

B. INSTRUCTIONAL AREAS

1. Stunning livestock

   a. Identifying basic operating features of types of stunning equipment

   b. Identifying and selecting stunning equipment and methods for stunning various types of livestock

   c. Using correct equipment, methods and procedures for stunning livestock

      (1) Using the electrical stunning equipment

(a) Adjusting voltage
(b) Placing equipment to the animal's head
(c) Determining length of time for electrical stunning

(2) Using mechanical stunning equipment (captive bolt, etc.)
(3) Preventing injuries to workers
(4) Preventing damage to stunning equipment
(5) Preventing excessive damage to carcass
(6) Caring for stunning equipment

2. Shackling livestock

a. Identifying basic operating features of shackling equipment to determine possible causes for delaying shackling

b. Identifying types of equipment for shackling livestock

c. Identifying major parts of shackling equipment and their functions

d. Using correct procedures for shackling livestock

3. Bleeding animals

a. Identifying reasons for properly bleeding various types of livestock

b. Identifying and selecting tools for bleeding various types of livestock

c. Sharpening bleeding knives

d. Using correct tools, methods and procedures for bleeding livestock

(1) Preventing excessive damage to the carcass
(2) Preventing injuries to workers
(3) Preventing damage to bleeding knives
(4) Determining length of time for bleeding

4. Cleaning and sanitizing shackling equipment and bleeding knives

a. The shackling equipment

(1) Selecting, measuring and mixing cleaning solutions according to manufacturer's directions

(2) Removing shackles from the shackling equipment for the purpose of cleaning and sanitizing
(3) Rinsing shackles and shackling equipment
(4) Cleaning shackles and shackling equipment
(5) Selecting, measuring and mixing sanitizing solutions
(6) Sanitizing shackles and shackling equipment
(7) Placing shackles on shackling equipment

b. The bleeding knives

(1) Selecting, measuring and mixing cleaning solutions according to manufacturer's directions
(2) Rinsing bleeding knives
(3) Cleaning bleeding knives
(4) Selecting, measuring and mixing sanitizing solutions
(5) Sanitizing bleeding knives
(6) Storing bleeding knives

5. Cleaning the stunning, shackling and bleeding work areas

a. Preparing work areas for washing down

(1) Arranging equipment and removing obstacles
(2) Checking areas for proper drainage

b. Washing down work areas

(1) Using water hoses for rinsing and washing
(2) Using brooms for scrubbing

c. Storing equipment used for cleaning work areas

(1) Placing water hoses in desired area
(2) Storing brooms and pails

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. Take a field trip to a meat processing plant and have each student indicate where he would stun livestock by marking the forehead.

2. Take field trips to different livestock processing plants and have plant managers or supervisors demonstrate and explain how to shackle beef animals.

3. Have students draw the head and neck of various types of livestock and indicate where and explain how and why they would bleed various types of livestock.

4. Have students practice measuring and mixing cleansers used for cleaning shackling equipment and bleeding knives.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Given live beef, lamb and pork animals to be stunned, the student must be able to select appropriate stunning equipment and stun them, preventing excessive damage to the head. The stunning processes should be performed accurately and within a time period considered reasonable for entering employment.

2. Given beef, lamb and pork ready for shackling, the student must be able to shackle them during a time considered reasonable for entering employment.

3. Given beef, lamb and pork animals shackled and ready for bleeding, the student must be able to bleed them, preventing blood from flowing back into the chest cavity and the carcass which could cause multiplication of bacteria and poor carcass appearance, within a time period considered reasonable for entering employment.

4. Using stunning, shackling and bleeding work areas in the school laboratory or livestock meat processing plant, the teacher or supervisor should provide the student with appropriate cleaning solutions, brooms, pails and water hoses. The student should clean the area so that it meets the approval of the teacher or cooperating supervisor.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. School meat laboratory or livestock meat processing plant

2. Each type of livestock to be slaughtered

3. Stunning equipment (electrical, captive bolt, etc.)

4. Bleeding knives

5. Hard hats, aprons and rubber boots

6. Cleaning and sanitizing chemicals, brooms, brushes, pails

F. EXAMPLES OF SUPPORTING REFERENCES

1. Breidenstein, Burdette C. Beef Operations in the Meat Industry. Ann Arbor, Michigan: Edwards Brothers, Inc. 1966, pp. 24-32.

   This section of the book includes black and white pictures and illustrations that will assist the reader in understanding basic information needed for successfully slaughtering beef animals.

2. Meat Processing Plant Employee. College Station, Texas: Vocational Instructional Services, Texas A & M University.

   This reference was written mainly for vocational students and includes basic information needed for entering and working successfully in livestock meat processing plants. Information, assignment, examination and answer sheets are included in addition to illustrations and pictures to assist students in comprehending information presented.

3. Ziegler, P. Thomas. Eighth Edition. The Meat We Eat. Danville, Illinois: The Interstate Printers and Publishers, Inc. 1962, pp. 63-119.

   This section of Ziegler's book contains basic information on slaughtering cattle, veal calves and sheep, and can be easily understood by vocational students. Black and white pictures and illustrations are also included.

PREPARING LIVESTOCK CARCASSES FOR THE COOLER AFTER BLEEDING

UNIT CONCEPT: Using correct procedures and methods for skinning, eviscerating, splitting and shrouding livestock will produce: (1) a safe, high quality product for human consumption; (2) a more attractive product for consumers; (3) maximum usable products from the animal; (4) a more efficient meat processing plant operation; (5) less damage to carcass and hide; and (6) fewer injuries to workers.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. In the school meat laboratory or livestock meat processing plant, when given livestock to be skinned, identify and demonstrate proper use of skinning tools by skinning livestock so that the hide is minimally damaged and the intestines and carcass are not cut.

2. When given special edible parts (head, feet, tail, etc.) to be removed and properly handled before eviscerating, remove the edible parts without damaging them or the carcass.

3. When given slaughtered livestock to be eviscerated, open the carcass and remove the edible and inedible parts without damage to the carcass or the parts.

4. When given eviscerated livestock carcasses, split the animal at the midline without damaging the carcass halves, wash the carcass to free it of all loose tissue or foreign material, and shroud the carcass for cooling.

5. Clean and sanitize tools and equipment used for skinning, removing special edible parts, eviscerating and splitting livestock, according to plant, local, state and federal sanitation standards.

B. INSTRUCTIONAL AREAS

1. Skinning livestock

   a. Identifying and selecting tools for skinning

   b. Sharpening skinning knives

   c. Using correct methods and procedures for skinning

      (1) Determining where to make initial incision
      (2) Removing the hide

         (a) Preventing damage to carcass and hide
         (b) Preventing injuries to workers

      (3) Sorting and storing hides

2. Removing and handling certain edible parts before eviscerating livestock

   a. Removing and handling the head

      (1) Skinning the head
      (2) Removing and storing edible parts

   b. Removing the front feet

3. Eviscerating edible and inedible parts

   a. Identifying and selecting tools for opening carcass and eviscerating edible and inedible parts

   b. Using correct methods and procedures for opening carcass and eviscerating edible and inedible parts

      (1) Opening the carcass
      (2) Removing the internal edible and inedible parts
      (3) Washing and storing internal edible parts
      (4) Storing inedible parts

   c. Emptying the paunch

4. Splitting livestock carcasses

   a. Identifying operating features of mechanical splitting saw

b. Identifying major parts to mechanical splitting saw and their functions

c. Identifying methods and procedures for mechanically splitting livestock carcasses

(1) Determining product to be split
(2) Adjusting splitting saw
(3) Locating and controlling the saw cut
(4) Preventing damage to carcass
(5) Using safe procedures to prevent injury to workers
(6) Preventing damage to equipment

d. Splitting carcass with cleaver

e. Splitting carcass with hand saw

5. Washing the carcass to remove loose tissue and foreign material

6. Shrouding carcass

a. Examining carcasses for bruises

b. Removing loose tissues and bruises

c. Preparing brine solution and soaking muslin

d. Securing the cloth with metal skewers

7. Cleaning and sanitizing tools and equipment

a. Selecting, measuring and mixing cleaning solutions according to manufacturer's directions

b. Rinsing tools

c. Cleaning tools

d. Selecting, measuring and mixing sanitizing solutions according to manufacturer's directions

e. Sanitizing tools

8. Using sanitation procedures for cleaning the work area where livestock are skinned, edible parts removed, eviscerated and split

a. Preparing work areas for washing down

(1) Arranging equipment and removing obstacles
(2) Checking areas for proper drainage

b. Washing down work areas

(1) Using water hoses for rinsing and washing
(2) Using brooms for scrubbing

c. Storing tools and equipment used for skinning, removing special edible parts, eviscerating and splitting livestock carcasses

(1) Placing water hoses in desired area
(2) Storing brooms and pails

9. Maintenance and care of the mechanical splitting saw

a. Lubricating

(1) Using service records
(2) Using service manuals
(3) Servicing specified systems or parts
(4) Checking all visible parts for malfunctions

b. Making adjustments on splitting saw

c. Storing splitting saw

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. a. Using the school meat laboratory or livestock meat processing plant and given carcasses to be skinned, have student indicate and explain how he or she would skin carcasses.

b. Take a field trip to a meat processing plant and have plant supervisor demonstrate and explain to students the procedures for skinning livestock.

2. Using the school meat laboratory or meat processing plant, demonstrate to students how the heads of different livestock should be removed.

3. Have students draw different types of livestock carcasses on the chalk board and indicate where and explain how and why they would open carcasses of different types of livestock.

4. Using the school meat processing lab or meat processing plant, divide students into small groups and have a contest to determine which group or groups can best shroud a livestock carcass in a given period of time.

5. Have students measure and mix cleaning solutions according to manufacturer's directions and use appropriate cleaning techniques in areas where livestock are skinned.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Each student will be provided with a beef animal and a lamb which have been killed and are ready for skinning. Working on the skinning floor or from shackles, the student must skin the animal after selecting appropriate tools. The student should accurately skin the animal with minimum damage to the carcass and hide, during a reasonable time period for entering employment.

2. Each student will be provided with livestock carcasses with special edible parts (head, feet, tail, etc.) to be removed and properly handled before eviscerating; the student must be able to remove the head, feet and tail of the animal without excessive damage to the parts or the carcass, during a reasonable time period for entering employment.

3. Each student will be provided with beef, lamb and swine carcasses which have been skinned and are ready to be eviscerated; the student must be able to eviscerate edible and inedible parts without damaging them, during a reasonable time period for entering employment.

4. Each student will be provided with beef carcasses to be split. Working on the splitting floor, the student must be able to split beef carcasses at the midline without damaging the carcass during a sawing period considered reasonable for entering employment.

5. Using work areas where livestock are skinned, special edible parts (head, feet, tail, etc.) removed, eviscerated and split, the student should be able to clean the work area so that it meets approval of the teacher or supervisor.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. School meat laboratory or livestock meat processing plant
2. Various types of livestock carcasses
3. Skinning, heading and gutting tools
4. Livestock splitting carcass equipment and adjustment tools
5. Hard hats, aprons and rubber boots
6. Muslin
7. Cleaning and sanitizing chemicals, brushes, brooms, pails
8. Servicing equipment

F. EXAMPLES OF SUPPORTING REFERENCES

1. Breidenstein, Burdette C. Beef Operations in the Meat Industry. Ann Arbor, Michigan: Edwards Brothers, Inc. 1966, pp. 24-32.

   This section of the book includes black and white pictures and illustrations that will assist the reader in understanding basic techniques needed for successfully slaughtering beef animals.

2. Meat Processing Plant Employee. College Station, Texas: Vocational Instructional Services, Texas A & M University.

   This reference was written mainly for vocational students and includes basic information needed for entering and working successfully in livestock meat processing plants. Information, assignment, examination and answer sheets are included, in addition to illustrations and pictures, to assist students in comprehending the material presented.

3. Zielger, P. Thomas. Eighth Edition. The Meat We Eat. Danville, Illinois: The Interstate Printers and Publishers, Inc. 1962, pp. 63-119.

   This section of Ziegler's book contains basic information on slaughtering cattle, veal calves and sheep, and can be easily understood by vocational students. Black and white pictures and illustrations are also included.

IDENTIFYING, CLASSIFYING AND GRADING LIVESTOCK CARCASSES

UNIT CONCEPT: Correct identification, classification and grading of livestock carcasses will assist the butcher in determining maximum use of the product as well as product price.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Name or describe accurately the livestock carcass classifications regarding age and sex for each type of livestock including cattle, swine and sheep.

2. For each type of livestock, identify the characteristics which would lower their carcass grades.

3. Using four animals of each of the types of livestock, rank the animals within each type according to their body quality and condition using the U.S. Department of Agriculture (USDA) grading standards as the guide.

B. INSTRUCTIONAL AREAS

1. Identifying livestock carcass classifications

   a. Classifying various livestock carcasses according to age

   b. Classifying various livestock carcasses according to sex (if applicable)

2. Determining carcass quality for various types of livestock

   a. Observing the conformation

   b. Examining the finish for the degree of fatness

   c. Identifying sex classifications (if applicable)

d. Determining quality by evidence of marbling and firmness of the lean in relation to maturity

3. Grading livestock carcasses

a. Beef and veal grading

(1) Determining class or kind of meat (beef, veal)
(2) Observing the conformation
(3) Determining the quality
(4) Determining yield grade

(a) Examining the amount of external fat
(b) Examining the amount of kidney, pelvic and heart fat
(c) Identifying and considering the rib eye muscle
(d) Determining carcass weight

(5) Determining carcass maturity

(a) Observing carcass color
(b) Examining texture of lean
(c) Examining ossification changes in the cartilages and bones

b. Pork grading

(1) Determining class of carcasses
(2) Determining expected yield of the four lean cuts (ham, loin, pic, Boston butt)
(3) Determining the quality
(4) Determining the finish
(5) Considering the muscular development by observing the size of the loin eye and other parts for thickness and plumpness

c. Lamb and mutton grading

(1) Determining class of carcasses
(2) Determining cutability by observing amount of excess trimmable fat and the amount of muscling
(3) Determining the finish by observing the amount of external fat and the amount of kidney, pelvic and heart fat
(4) Determining muscle development

(5) Determining quality
(6) Determining maturity
(7) Determining yield grade

(a) Examining amount of external fat
(b) Examining amount of kidney and pelvic fat
(c) Considering the conformation grade of the legs

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. Use school meat laboratory or meat processing plants and have students compare and explain the difference in the conformation between a prime beef steer and a utility stag.

2. Have students examine the amount of fat on various pork carcasses.

3. Have students rank lamb carcasses according to body quality and condition.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Given several lamb carcasses, the student must be able to classify the carcasses in terms of age by observing the bones, general conformation, and the flesh.

2. Given several pork carcasses, the student must be able to examine the carcasses and list visible defects on them.

3. Given several beef carcasses, the student must be able to rank the carcasses according to body quality and condition, and record the placement on paper or score cards. The student should also verbally give reasons for placing.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. School meat laboratory and livestock meat processing plant

2. Various types of livestock carcasses (beef, pork, lamb)

3. Hard hats and rubber boots

F. EXAMPLES OF SUPPORTING REFERENCES

1. Meat Evaluation Handbook. Chicago, Illinois: National Livestock and Meat Board. Pages 38-51.

   This reference covers basic technical information needed for grading livestock (beef, pork, lamb) meat carcasses.

2. Ziegler, P. Thomas. Ninth Edition. The Meat We Eat. Danville, Illinois: The Interstate Printers and Publishers, Inc. 1966, pp. 267-275.

   Technical information needed for grading livestock (beef, pork, lamb, veal) is included in this reference.

CLEANING AND SANITIZING TOOLS AND EQUIPMENT USED FOR CUTTING WHOLESALE AND RETAIL MEAT CUTS

UNIT CONCEPT: Tools and equipment used for cutting up meat parts, and the work areas, must be properly cleaned and sanitized to prevent product contamination.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using facilities in the school meat laboratory or a commercial meat cutting department, clean and sanitize tools and equipment used for cutting up meat parts so that the facility's sanitation requirements are met in addition to local, state and federal sanitation standards.

B. INSTRUCTIONAL AREAS

1. Cleaning and sanitizing tools and equipment used for cutting up meat parts

   a. The knives and hand saws

      (1) Selecting, measuring and mixing cleaning solutions according to manufacturer's directions
      (2) Rinsing knives and hand saws
      (3) Cleaning knives and hand saws

         (a) Using brushes
         (b) Preventing injuries to workers

      (4) Selecting, measuring and mixing sanitizing solutions
      (5) Sanitizing knives and hand tools

         (a) Using brushes
         (b) Preventing injuries to workers

   b. The mechanical meat saws

(1) Identifying parts requiring cleaning and sanitizing
(2) Using tools to disassemble parts requiring thorough cleaning and sanitizing
(3) Selecting, measuring and mixing cleaning solutions according to manufacturer's directions
(4) Protecting parts of the equipment that should not come into contact with water, cleaning or sanitizing chemicals
(5) Rinsing mechanical meat saws
(6) Selecting brushes for cleaning
(7) Cleaning mechanical meat saws with the use of brushes
(8) Selecting, measuring and mixing sanitizers
(9) Sanitizing mechanical meat saws with the use of brushes

2. Using sanitation procedures for cleaning areas where meat parts are cut

a. Preparing work areas for washing down

(1) Arranging equipment and moving obstacles
(2) Checking areas for proper drainage

b. Washing down work areas

(1) Using water hoses for rinsing and washing
(2) Using brooms for scrubbing

c. Storing equipment used for cleaning work areas

(1) Placing water hoses in desired area
(2) Storing brooms and pails

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. Have students practice re-storing water hoses in desired area in the school meat laboratory or commercial meat cutting department.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Given sanitizing solutions used for sanitizing meat cutting equipment and tools, the student must be able to measure and mix sanitizers according to manufacturer's directions.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. School meat laboratory and/or access to a meat cutting department in a grocery store

2. Meat cutting saws

3. Meat cutting hand tool[illegible] steak knife; butcher knives; and other miscellan[illegible] of this sort

4. Hard hats, aprons, r[illegible]

5. Cleaning and sanitizing solutions, brooms, brushes, pails

F. EXAMPLES OF SUPPORTING REFERENCES

1. Levie, Albert. The Meat Handbook. Westport, Connecticut: The AVI Publishing Company, Inc. 1970, pp. 158-159.

   Levie's book briefly discusses the importance of using sanitation procedures when cutting up meat products.

IDENTIFYING AND CUTTING WHOLESALE AND RETAIL BEEF CUTS

UNIT CONCEPT: Accurate identification and proper cutting of wholesale and retail beef meat cuts will assist the retailer in determining meat prices and maximum use of the product as well as providing the consumer with a desired quality beef product.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using facilities of a commercial meat cutting department and/or comparable facilities in the school meat laboratory, identify and cut up beef side carcasses into the prescribed wholesale cuts accurately within a time period acceptable for entry level employment in the beef meat industry.

2. Given beef wholesale meat cuts, identify and cut into retail cuts accurately within a time period acceptable for entry level employment in the beef meat industry.

B. INSTRUCTIONAL AREAS

1. Identifying wholesale beef cuts

   a. Recognizing the bone structure of beef side carcasses and the wholesale cuts

   b. Recognizing the muscle structure of beef side carcasses and the wholesale cuts

2. Cutting beef side carcasses into wholesale meat cuts

   a. Selecting and sharpening knives

   b. Cutting beef side carcasses into hindquarter and forequarter

      (1) Counting twelve ribs and leaving one rib on the hind quarter

(2) Separating quarters with meat cutting tools and equipment (saw, knives)

c. Separating the chuck from the rib, brisket and shank

(1) Counting five ribs for determining initial cuts from neck
(2) Separating the chuck from the brisket and shank

d. Separating shank and brisket by finding indent on arm bone and removing the parts

e. Locating and making cuts for removing short plate from rib and flank

f. Cutting the flank from the sirloin tip to the thirteenth rib

g. Separating round and sirloin

(1) Finding area for cutting angle
(2) Scoring with knife
(3) Sawing bone with meat saw

h. Removing rump from round

(1) Marking and cutting muscle
(2) Sawing bone with meat saw and removing rump

3. Identifying retail beef cuts

a. Recognizing the bone structure of the wholesale and retail cuts

b. Recognizing muscle structure of the wholesale and retail cuts

4. Cutting out beef retail cuts from various wholesale cuts

a. Selecting and using meat saws and hand tools (cleaver, steak and butcher knives, block scraper) to cut the retail cuts from the chuck:

(1) Inside chuck roll
(2) Chuck tender
(3) Blade pot roasts and steaks
(4) Boneless shoulder pot roasts and steaks
(5) Petite steaks

(6) Arm pot roasts and steaks
(7) English (Boston) cut
(8) Cutting off parts for ground beef and beef patties

b. Selecting and using meat saws and hand tools to cut the retail cuts from the shank:

(1) Shank cross cuts
(2) Beef stew
(3) Cutting off parts for ground beef and beef patties

c. Selecting and using meat saws and hand tools to cut the retail cuts from the brisket:

(1) Fresh brisket
(2) Corned brisket
(3) Cutting off parts for ground beef and beef patties

d. Selecting and using meat saws and hand tools to cut the retail cuts from the rib:

(1) Standing rib roast
(2) Rib steaks
(3) Rib steaks (boneless)
(4) Delmonico (rib eye) roasts and steaks
(5) Cutting off parts for ground beef and beef patties

e. Selecting and using meat saws and hand tools to cut the retail cuts from the short plate:

(1) Short ribs
(2) Short steak fillets
(3) Rolled plate
(4) Plate beef
(5) Cutting off parts for ground beef and beef patties

f. Selecting and using meat saws and hand tools to cut the retail cuts from the short loin:

(1) Club steaks
(2) T-bone steaks
(3) Porterhouse steaks
(4) Top loin steaks
(5) Filet mignon

(6) Tenderloin steaks
(7) Cutting off parts for ground beef and beef patties

g. Selecting and using meat saws and hand tools to cut the retail cuts from the flank:

(1) Flank steaks
(2) Flank steak fillets
(3) Cutting off parts for ground beef and beef patties
(4) Rolled flank
(5) Flank meat

h. Selecting and using meat saws and hand tools for retail cuts from the sirloin:

(1) Pin bone sirloin steak
(2) Flat bone sirloin steak
(3) Wedge bone sirloin steak
(4) Boneless sirloin steak
(5) Tip steak
(6) Cube steak
(7) Sirloin tip

i. Selecting and using meat saws and hand tools to cut the retail cuts from the rump:

(1) Tip steak
(2) Sirloin tip
(3) Cube steak
(4) Rolled rump
(5) Standing rump

j. Selecting and using meat saws and hand tools to cut the retail cuts from the round:

(1) Heel of round
(2) Top round steaks
(3) Bottom round steaks
(4) Round steaks
(5) Eye of round
(6) Cutting off parts for ground beef and beef patties

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. Use the school meat laboratory or commercial meat cutting department and have each student select and sharpen tools needed for cutting the round from a side beef carcass.

2. Divide the class into small groups of three and have each student in the group take turns selecting appropriate tools and cutting out one retail cut from the chuck. The students should evaluate each other on tool selection, cutting accuracy and time taken for cutting.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Using the school meat laboratory or commercial meat cutting department with beef carcasses to be cut up into wholesale cuts, provide each student with a side beef carcass. The student must be capable of selecting appropriate tools and removing the round from the side carcass with a high degree of competency. The teacher or cooperating supervisor (co-op program) must evaluate the student on tool selection, accuracy in cutting and amount of time needed for removing the round, based on entry level skills needed for entering the beef meat industry. A similar evaluation should be done for each student for each wholesale cut.

2. Given a round wholesale meat cut, each student should be capable of selecting meat saws and hand tools and cutting out all desired retail cuts from the round with a high degree of competency. The teacher or cooperating supervisor should evaluate the student on tool selection, accuracy in cutting and amount of time needed for cutting all prescribed retail cuts, based on entry level skills needed for entering the beef meat industry. A similar evaluation should be conducted for each student for cutting all wholesale cuts into retail cuts.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. School meat laboratory and/or meat department in a grocery store

2. Beef carcass (wholesale and retail cuts)

3. Meat cutting saws

4. Meat cutting hand tools: cleaver, steak knive, butcher knife, boning knife, sharpening stone, hook, block brush, block scraper

5. Hard hats, aprons, rubber boots

F. EXAMPLES OF SUPPORTING REFERENCES

1. Bisarek, Kenneth and Moffett, Luther. Butcher. Fennimore, Wisconsin: Southwest Wisconsin Vocational-Technical School. 32 pages.

   This reference outlines four hundred hours of technical knowledge needed by a student desiring to become an all-around butcher.

2. Levie, Albert. The Meat Handbook. Westport, Connecticut: The AVI Publishing Company, Inc. 1970, pp. 161-230.

   This section of Levie's book includes basic information needed for entering and working successfully as a beef butcher. Black and white pictures and illustrations are included to assist the reader in understanding the information presented.

3. Meat Processing Plant Employee. College Station, Texas: Vocational Instructional Services, Texas A & M University.

   This reference discusses the knowledge needed to work efficiently in livestock slaughtering processing plants as well as meat departments in grocery stores.

4. 101 Meat Cuts - A Guide to Meat Selection and Care. Chicago, Illinois: National Livestock and Meat Board. 36 pages.

   This reference identifies wholesale and retail cuts for livestock meat carcasses (beef, veal, lamb, pork) as well as variety cuts. Color pictures are also included for each livestock wholesale and retail meat cut.

5. Uniform Retail Meat Identity Standards. Chicago, Illinois: Industry-wide Cooperative Meat Identification Standards Committee, National Livestock and Meat Board. 1973.

   This reference includes recommended names for commonly used names of retail meat cuts (beef, pork, lamb, veal). This material was written because of frustrating experiences of American shoppers, due to the lack of uniformity in names of meat cuts and standards for labeling. Information sheets, charts, illustrations and pictures are included to assist the reader in understanding the material presented.

6. Ziegler, P. Thomas. Eighth Edition. The Meat We Eat. Danville, Illinois: The Interstate Printers and Publishers, Inc. 1962, pp. 63-119.

This section includes procedures for cutting up beef, veal and sheep carcasses into wholesale and retail meat cuts.

IDENTIFYING AND CUTTING WHOLESALE AND RETAIL VEAL MEAT CUTS

UNIT CONCEPT: Accurate identification and proper cutting of wholesale and retail veal will assist the retailer in determining meat prices, give maximum use of the product as well as provide the consumer with the desired quality veal product.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using facilities of a commercial meat cutting department and/or comparable facilities in the school meat laboratory, identify and cut up veal carcasses into prescribed wholesale cuts with accuracy within a time period acceptable for entry level employment in the veal meat industry.

2. Given veal wholesale meat cuts, identify and cut up wholesale veal meat cuts into retail cuts accurately within a time period acceptable for entry level employment in the veal meat industry.

B. INSTRUCTIONAL AREAS

1. Identifying wholesale veal cuts

   a. Recognizing the bone structure of veal carcasses and the wholesale cuts

   b. Recognizing the muscle structure of veal carcasses and the wholesale cuts

2. Cutting veal carcasses into wholesale meat cuts

   a. Locating and making fore saddle cuts

   b. Locating and making hind saddle cuts

   c. Locating and making long saddle cuts

d. Locating and making cuts for removing the shoulder wholesale cut from the foreshank, breast and rack

e. Locating and making cuts for removing the foreshank from the breast

f. Locating and making cuts for removing the breast from the rack and flank

g. Locating and making cuts for removing the rack from the loin

h. Locating and making cuts for removing the loin from the leg and flank

i. Locating and making cuts for removing the flank from the leg

3. Identifying veal retail meat cuts

a. Recognizing the bone structure of veal wholesale and retail cuts

b. Recognizing the muscle structure of veal wholesale and retail cuts

4. Cutting out veal retail cuts from various wholesale cuts

a. Selecting and using meat saws and hand tools (cleaver, butcher knives, block scraper, etc.) to cut the following retail cuts from the shoulder:

(1) Arm roasts and steaks
(2) Blade roasts and steaks
(3) Rolled shoulder
(4) Neck
(5) Large and small pieces of meat for stew

b. Selecting and using meat saws and hand tools to cut the following retail cuts from the breast:

(1) Riblets
(2) Breast
(3) Stuffed breast
(4) Brisket rolls
(5) Brisket pieces
(6) Stuffed chops

c. Selecting and using meat saws and hand tools to cut the following retail cuts from the rack:

(1) Rib roasts
(2) Crown roasts
(3) Rib chops
(4) Frenched rib chops

d. Selecting and using meat saws and hand tools to cut the following retail cuts from the loin:

(1) Loin roasts
(2) Sirloin steaks
(3) Rolled double sirloin
(4) Cube steak

e. Selecting and using meat saws and hand tools to cut the following retail cuts from the leg:

(1) Standing rump
(2) Rolled leg
(3) Cutlets, boneless
(4) Rolled cutlets (birds)
(5) Shank half of leg
(6) Center leg
(7) Round steaks
(8) Heel of round
(9) Pieces of meats for making:

(a) Mock chicken legs
(b) Choplets
(c) Patties
(d) Ground veal

(10) Rolled cube steaks (birds)
(11) City chicken

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. Divide students into groups of three. Use the school meat laboratory or commercial meat cutting department stocked with veal carcasses to be cut up into wholesale cuts, and provide students with various types of tools used by the all-around butcher. Each student

should select and sharpen the tools needed. The other students in the group should evaluate him on tool selection and sharpening techniques. The activity should be rotated so that each student has participated in tool selection and cutting of each wholesale cut.

2. Use color pictures of veal retail cuts which are not labeled and have each student verbally identify the retail cuts. Those students who are capable of verbally identifying all retail cuts should be given some type of small reward that is agreed upon by the students and the vocational teacher. This technique should be used in a manner so that all students are rewarded.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Using a commercial meat cutting department or the school meat laboratory with similar facilities and equipment, provide each student with a side veal carcass to be cut into wholesale cuts. The student must be capable of selecting appropriate tools and removing the leg from the side carcass with a high degree of competency. The teacher or cooperating employer (co-op programs) must evaluate the student on tool selection, accuracy in cutting and amount of time taken for removing the leg, based on entry level skills needed for entering the veal meat industry. A similar evaluation should be done with each student for each wholesale cut.

2. Given a veal leg wholesale meat cut, each student must be proficient in selecting meat saws and hand tools and sharpen those tools when needed while cutting out retail cuts from the leg with a high degree of competency. The teacher or cooperating employer (co-op programs) must evaluate the student for tool selection, sharpening techniques, accuracy for cutting out all prescribed retail cuts from the leg and amount of time needed for cutting out all prescribed retail cuts, based on entry level skills needed for entering the veal meat industry. A similar evaluation should be conducted with each student for cutting all veal wholesale cuts into retail cuts.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Facilities of a commercial meat cutting department and/or comparable facilities in the school meat laboratory

2. Veal (wholesale and retail cuts)

3. Meat cutting saws

4. Meat cutting hand tools: cleaver, steak knives, butcher knives, boning knives, sharpening stone, block brush, metal cutting tables

5. Hard hats, aprons, rubber boots

F. EXAMPLES OF SUPPORTING REFERENCES

1. Bisarek, Kenneth and Moffett, Luther. Butcher. Fennimore, Wisconsin: Southwest Wisconsin Vocational-Technical School. Page 16.

   This reference outlines four hundred hours of technical knowledge needed by a student desiring to become an all-around butcher.

2. Levie, Albert. The Meat Handbook. Westport, Connecticut: The AVI Publishing Company, Inc. 1970, pp. 231-251.

   This section of the book covers wholesale and retail veal cuts. Black and white pictures and illustrations are included to assist the student in understanding the processes.

3. Meat Processing Plant Employee. College Station, Texas: Vocational Instructional Services, Texas A & M University.

   This reference discusses the knowledge needed to work efficiently in livestock slaughtering processing plants as well as meat departments in grocery stores.

4. 101 Meat Cuts - A Guide to Meat Selection and Care. Chicago, Illinois: National Livestock and Meat Board. Pages 12-15.

   This reference identifies wholesale and retail cuts for livestock meat carcasses (beef, veal, lamb, pork) as well as variety cuts. Color pictures are also included for each cut.

5. Uniform Retail Meat Identity Standards. Chicago, Illinois: Industrywide Cooperative Meat Identification Standards Committee, National Livestock and Meat Board. 1973.

   This reference includes recommended names for retail meat cuts (beef, pork, lamb, veal). It was written because of the lack of

uniformity in names of meat cuts and standards for labeling. Information sheets, charts, illustrations and pictures are included to assist the reader in understanding the materials presented.

6. Ziegler, P. Thomas. Eighth Edition. The Meat We Eat. Danville, Illinois: The Interstate Printers and Publishers, Inc. 1962, pp. 351-356.

Ziegler briefly discusses the information needed for cutting up wholesale and retail veal meat cuts. Pictures and illustrations are also included.

IDENTIFYING AND CUTTING
WHOLESALE AND RETAIL LAMB OR MUTTON MEAT CUTS

UNIT CONCEPT: Accurate identification and proper cutting of wholesale and retail lamb or mutton meat cuts will assist the retailer in determining meat prices and assure maximum use of the product as well as provide the consumer with a quality lamb or mutton product.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using the facilities of a commercial meat cutting department and/or comparable facilities in the school meat laboratory, identify and cut up lamb and/or mutton side carcasses into prescribed wholesale cuts accurately within a time period acceptable for entry level employment in the lamb and mutton meat industry.

2. Given lamb and/or mutton wholesale meat cuts, identify and cut up wholesale lamb and mutton meat cuts into retail cuts accurately within a time period acceptable for entry level employment in the lamb and mutton meat industry.

B. INSTRUCTIONAL AREAS

1. Identifying wholesale lamb and/or mutton cuts

   a. Recognizing the bone structure of lamb and mutton side carcasses and the wholesale cuts

   b. Recognizing the muscle structure of lamb and mutton side carcasses and the wholesale cuts

2. Cutting lamb and mutton carcasses into wholesale meat cuts

   a. Locating and making fore saddle cuts

   b. Locating and making hind saddle cuts

   c. Locating and making long saddle cuts

d. Locating break joint and cutting off lower hind shank from leg

e. Locating break joint and cutting off upper fore shank from the fore shank wholesale cut

f. Locating and making cuts for removing shoulder from the rack, shank and breast

g. Locating and making cuts for separating fore shank from the breast

h. Locating and making cuts for removing breast from the rack and loin

i. Locating and making cuts for separating the rack from the loin

j. Locating and cutting off the loin from the leg

3. Identifying lamb and mutton retail meat cuts

a. Recognizing the bone structure of lamb and mutton wholesale and retail cuts

b. Recognizing the muscle structure of lamb and mutton wholesale and retail cuts

4. Cutting out lamb retail cuts from various wholesale cuts

a. Selecting and using meat saws and hand tools (cleaver, butcher knives, block scraper) to cut the following retail cuts from the shoulder:

(1) Neck slices
(2) Cubes for kabobs
(3) Cushion shoulder
(4) Saratoga chops
(5) Rolled shoulder
(6) Blade chop
(7) Square shoulder
(8) Arm chop

b. Selecting and using meat saws and hand tools to cut out the following retail cuts from the breast:

(1) Rolled breast

(2) Breast
(3) Riblets
(4) Ribs (for barbeque)
(5) Brisket pieces
(6) Stew meat
(7) Meat for patties

c. Selecting and using meat saws and hand tools to cut out the following retail cuts from the rack:

(1) Rib roast
(2) Crown roast
(3) Rib chops
(4) French rib chops

d. Selecting and using meat saws and hand tools to cut out the following retail cuts from the loin:

(1) Loin chops
(2) English chop
(3) Rolled double loin
(4) Loin roast

e. Selecting and using meat saws and hand tools to cut out the following retail cuts from the sirloin:

(1) Sirloin chop
(2) Rolled double sirloin
(3) Sirloin roast

f. Selecting and using meat saws and hand tools to cut out the following retail cuts from the leg:

(1) Combination leg
(2) Rolled leg
(3) Leg chop (steak)
(4) Sirloin half of leg
(5) Shank half of leg
(6) Leg, sirloin on
(7) Leg, sirloin off
(8) American leg
(9) Center leg
(10) Hind shank
(11) Cube steak

(12) Lamb for stew
(13) Pieces of meat for ground lamb and lamburgers

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. Use a chalk board and have each student draw a lamb side carcass and indicate where they would separate the prescribed wholesale cuts by marking through the drawn side carcass.

2. Use a commercial meat store and have each student verbally identify all prescribed retail cuts from the lamb carcass. The students should evaluate each other on correct identification.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Using the school meat laboratory or commercial meat cutting department stocked with lamb and mutton carcasses to be cut into wholesale cuts, provide each student with a side lamb and/or mutton carcass. The student should be capable of selecting appropriate tools and removing the shoulder from the side carcass with a high degree of competency. The vocational teacher or cooperating teacher (co-op programs) should evaluate the student on tool selection, accuracy in cutting and the amount of time taken for removing the shoulder, based on entry level skills needed for entering the lamb and mutton meat industry. A similar evaluation should be performed with each student for each lamb and/or mutton wholesale cut.

2. Given a lamb shoulder wholesale meat cut, each student should be proficient in selecting a meat saw and appropriate hand tools and cutting out all desired retail cuts from the shoulder with a high degree of competency. The vocational teacher or cooperating teacher should evaluate the student on tool selection and accuracy in cutting based on entry level skills needed for entering the lamb and mutton meat industry. A similar evaluation should be conducted with each student for cutting all lamb wholesale cuts into retail cuts.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Facilities of a commercial meat cutting department and/or comparable facilities in the school meat laboratory

2. Lamb and mutton (wholesale and retail cuts)

3. Meat cutting saws

4. Meat cutting hand tools: cleaver, steak knives, butcher knives, boning knives, sharpening stone, block brush, metal cutting tables

5. Hard, hats, aprons, rubber boots

F. EXAMPLES OF SUPPORTING REFERENCES

1. Bisarek, Kenneth and Moffett, Luther. Butcher. Fennimore, Wisconsin: Southwest Wisconsin Vocational-Technical School. Page 17.

   This reference outlines four hundred hours of technical knowledge needed by a student desiring to become an all-around butcher.

2. Meat Processing Plant Employee. College Station, Texas: Vocational Instructional Services, Texas A & M University.

   This reference discusses the knowledge needed to work efficiently in livestock slaughtering processing plants as well as meat departments in grocery stores.

3. 101 Meat Cuts - A Guide to Meat Selection and Care. Chicago, Illinois: National Livestock and Meat Board. 36 pages.

   This reference identifies wholesale and retail cuts for livestock meat carcasses (beef, veal, lamb, pork) as well as variety cuts. Color pictures of all the cuts are included.

4. Uniform Retail Meat Identity Standards. Chicago, Illinois: Industry-wide Cooperative Meat Identification Standards Committee, National Livestock and Meat Board. 1973.

   This reference includes recommended names for commonly used names of retail meat cuts (beef, pork, lamb, veal). This material was written because of frustrating experiences of American shoppers, due to the lack of uniformity in names of meat cuts and standards for labeling. Information sheets, charts, illustrations and pictures are included to assist the reader in understanding the material presented.

REMOVING THE HAIR ON SWINE CARCASSES

UNIT CONCEPT: Swine carcasses must be properly scalded, dehaired, singed, shaved and washed to assist in providing consumers with attractive pork products.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using the school meat laboratory or livestock meat processing plant and given swine to be scalded, scald them with the use of appropriate equipment so that the process meets the approval of the teacher or cooperating supervisor.

2. Given swine dehairing equipment, dehair swine so that the process meets the approval of the teacher or cooperating supervisor.

3. Given a swine singer and shaver, singe and shave swine carcasses so that these processes meet the approval of the teacher or cooperating supervisor and the carcass is ready to be eviscerated.

4. Clean and sanitize tools and equipment used for removing the hair on swine carcasses so that plant sanitation requirements are met in addition to local, state and federal sanitation standards.

B. INSTRUCTIONAL AREAS

1. Scalding swine

   a. Identifying major parts to scalding equipment and their functions

   b. Measuring and mixing chemicals used to assist in scalding swine

   c. Using appropriate procedures for scalding swine

      (1) Determining and adjusting water temperature

(2) Determining and setting length of time for scalding
(3) Operating the scalding equipment

(a) Preventing damage to carcass
(b) Preventing injuries to workers
(c) Preventing damage to equipment

d. Servicing scalding equipment

(1) Using service records
(2) Using service manuals
(3) Servicing specified systems or parts
(4) Checking all visible parts for malfunctions

2. Dehairing swine

a. Identifying major parts to dehairing equipment and their functions

b. Making adjustments on swine dehairing equipment (hot water spray for rinsing, etc.)

c. Checking swine on elevator to make sure that they properly move through the dehairing machine

d. Operating dehairing equipment

(1) Preventing damage to carcass
(2) Checking swine carcass for proper dehairing

e. Servicing dehairing equipment

(1) Using service records
(2) Using service manuals
(3) Servicing specified systems or parts
(4) Checking all visible parts for malfunctions

3. Using appropriate procedures for preparing the carcass for eviscerating

a. Singeing swine carcasses

(1) Adjusting the singeing equipment
(2) Removing hair with the singer

(a) Preventing damage to carcass
(b) Preventing injuries to workers

b. Shaving swine carcasses

(1) Selecting tools for shaving
(2) Sharpening shaving tools
(3) Removing hair with the use of the shaver

(a) Preventing damage to carcass
(b) Preventing injuries to workers

c. Washing down the carcass with water hoses before eviscerating

4. Using sanitation procedures for cleaning and sanitizing tools and equipment used for removing hair from swine carcasses

a. The shaving tools

(1) Selecting, measuring and mixing cleansers according to manufacturer's directions
(2) Rinsing shaving tools
(3) Cleaning shaving tools
(4) Selecting, measuring and mixing sanitizers
(5) Sanitizing shaving tools

b. The scalding and dehairing equipment

(1) Selecting, measuring and mixing cleansers
(2) Rinsing scalding and dehairing equipment
(3) Cleaning scalding and dehairing equipment
(4) Selecting, measuring and mixing sanitizers
(5) Sanitizing scalding and dehairing equipment

5. Using sanitation procedures for cleaning areas where the hair of swine is removed

a. Preparing work areas for washing down

(1) Arranging equipment and removing obstacles
(2) Checking areas for proper drainage

b. Washing down work areas

(1) Using water hoses for rinsing and washing
(2) Using brooms for scrubbing

c. Storing equipment used for cleaning work areas

(1) Placing water hoses in desired area
(2) Storing brooms and pails

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. a. Have students in the class adjust the water temperature in the swine scalding equipment according to temperature specified by the teacher.

b. Divide the class into groups of three and have each group practice scalding swine.

2. Have students in the class practice dehairing swine with the use of a swine dehairer.

3. Divide the class into groups of three and have students shave the head of a swine which has been scalded.

4. Have students mix sanitizers according to manufacturer's specifications to be used for sanitizing the tools and equipment for removing the hair on swine carcasses.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Given a swine to be scalded, the student must be able to scald it with the use of scalding equipment so that hair is removed and the process meets the approval of the teacher or cooperating supervisor.

2. Given a swine to be dehaired, the student must be able to dehair it with the appropriate equipment to the satisfaction of the teacher or cooperating supervisor.

3. Given a section of a swine carcass to be shaved, the student must be able to shave the carcass section so that the process meets the approval of the teacher or cooperating supervisor.

4. Given sanitizing solutions used for sanitizing tools and equipment which have been used for removing the hair of swine, the student must be able to measure and mix sanitizers according to manufacturer's directions.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. School meat laboratory or livestock meat processing plant

2. Swine scalding equipment, dehairing equipment, singeing equipment, shaving equipment

3. Swine carcasses

4. Hard hats, rubber boots, aprons

5. Cleansers and sanitizers, brooms, brushes, pails

F. EXAMPLES OF SUPPORTING REFERENCES

1. Ziegler, P. Thomas. Ninth Edition. The Meat We Eat. Danville, Illinois: The Interstate Printers and Publishers, Inc. 1966, pp. 39-43.

   This section of the book briefly discusses processes involved in scalding swine.

IDENTIFYING AND CUTTING WHOLESALE AND RETAIL PORK CUTS

UNIT CONCEPT: Accurate identification and proper cutting of wholesale and retail pork meat cuts will assist the retailer in determining meat prices and assure maximum use of the product as well as provide the consumer with a quality pork product.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using facilities of a commercial meat cutting department and/or comparable facilities in the school meat laboratory, identify and cut up pork side carcasses in the prescribed wholesale cuts, with accuracy and time limits acceptable for entry level employment in the pork meat industry.

2. Given pork wholesale meat cuts, identify and cut up wholesale pork cuts into retail cuts accurately within a time period acceptable for entry level employment in the pork meat industry.

B. INSTRUCTIONAL AREAS

1. Identifying wholesale pork cuts

   a. Recognizing the bone structure of pork side carcasses and the wholesale cuts

   b. Recognizing the muscle structure of pork side carcasses and the wholesale cuts

2. Cutting pork side carcasses into wholesale meat cuts

   a. Locating correct fore foot bone and cutting off fore foot from picnic

   b. Cutting pork heads

(1) Locating and removing the jowl
(2) Removing eyes
(3) Locating and pulling out ear canal
(4) Locating atlas joint and removing head
(5) Locating and removing the snout

c. Cutting a pork shoulder leaving three ribs

d. Separating the picnic from the shoulder

(1) Determining product use and demand before cutting
(2) Locating correct area for making cut

e. Separating ham from loin

(1) Removing kidney
(2) Removing leaf lard
(3) Pulling loose curing vein
(4) Cutting the ham from the loin

f. Cutting pork belly

(1) Separating belly from loin
(2) Cutting and lifting spare ribs out

g. Locating correct hind foot bone and cutting off hind foot from ham

3. Identifying pork retail meat cuts

a. Recognizing the bone structure of the wholesale and retail cuts

b. Recognizing muscle structure of the wholesale and retail cuts

4. Cutting out pork retail cuts from various wholesale cuts

a. Selecting and using meat saws and hand tools (cleaver, butcher knives, block scraper, etc.) to cut the retail cuts from the <u>boston butt:</u>

(1) Boston butt
(2) Blade steak
(3) Rolled boston butt
(4) Shoulder butt

(5) Pieces of meats for sausages
(6) Porklet
(7) Fat lard
(8) Lard

b. Selecting and using meat saws and hand tools to cut out the following retail cuts from the picnic:

(1) Fresh picnic
(2) Rolled fresh picnic
(3) Arm roasts and steaks
(4) Canned picnic
(5) Fresh hocks

c. Selecting and using hand tools to cut out jowl bacon from the jowl

d. Selecting and using meat saws and hand tools to cut out the following retail cuts from the belly:

(1) Salt pork
(2) Slab and sliced bacon
(3) Barbecue ribs

e. Selecting and using meat saws and hand tools to cut out the following retail cuts from the loin:

(1) Blade loin roasts and steaks
(2) Country style hackbone
(3) Back rib
(4) Center loin roasts and chops
(5) Rib chops
(6) Butterfly chops
(7) Rolled loin roast
(8) Sirloin roasts and chops
(9) Tenderloin
(10) Canadian style bacon

f. Selecting and using meat saws and hand tools to cut out the following retail cuts from the ham:

(1) Smoked ham shank portion
(2) Smoked ham butt portion
(3) Smoked ham center slice

(4) Rolled fresh ham (leg)
(5) Smoked ham boneless roll
(6) Sliced cooked "boiled" ham
(7) Canned ham

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. Use the school meat laboratory or commercial meat cutting department and have students verbally identify wholesale pork cuts. The students should evaluate each other on correct identification.

2. Using the school meat laboratory or commercial meat cutting department, divide the class into groups of three and have students in each group take turns selecting appropriate tools and cutting one retail cut from the loin. The students in each group should evaluate each other on tool selection, cutting accuracy and time taken for the cutting.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Using the school meat laboratory or commercial meat cutting department and a supply of pork carcasses to be cut, provide each student with a side pork carcass. The student must be capable of selecting appropriate tools and removing the loin from the side carcass with a high degree of competency. The teacher or cooperating teacher (co-op programs) must evaluate each student on tool selection, accuracy in cutting and amount of time needed for removing the pork loin, based on entry level skills needed for entering the pork meat industry.

2. Given a pork loin wholesale meat cut, each student must be proficient in selecting a meat saw and hand tools and cutting all desired retail cuts from the loin with a high degree of competency. The teacher or cooperating teacher (co-op programs) must evaluate each student on tool selection, accuracy in cutting and the amount of time needed for cutting out all prescribed retail cuts, based on entry level skills needed for entering the pork meat industry.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Facilities of a commercial meat cutting department and/or comparable facilities in the school meat laboratory

2. Pork carcasses (wholesale and retail cuts)

3. Meat cutting saws

4. Meat cutting hand tools: cleaver, steak knives, butcher knives, boning knives, sharpening stone, block brush, metal cutting tables

5. Hard hats, aprons, rubber boots

F. EXAMPLES OF SUPPORTING REFERENCES

1. Bisarek, Kenneth and Moffett, Luther. Butcher. Fennimore, Wisconsin: Southwest Wisconsin Vocational-Technical School. Pages 12-13.

   This reference outlines four hundred hours of technical knowledge needed by a student desiring to become an all-around butcher.

2. Meat Processing Plant Employee. College Station, Texas: Vocational Instructional Services, Texas A & M University.

   This reference discusses the information needed to work efficiently in livestock slaughtering processing plants as well as meat departments in grocery stores.

3. 101 Meat Cuts - A Guide to Meat Selection and Care. Chicago, Illinois: National Livestock and Meat Board. Pages 16-26.

   This reference identifies wholesale and retail cuts for livestock meat carcasses (beef, veal, lamb, pork) as well as variety cuts. Color pictures are also included for each livestock wholesale and retail meat cut.

4. Uniform Retail Meat Identity Standards. Chicago, Illinois: Industrywide Cooperative Meat Identification Standards Committee, National Livestock and Meat Board. 1973.

   This reference includes recommended names for retail meat cuts (beef, pork, lamb, veal). This material was written because of the lack of uniformity in names of meat cuts and standards of labeling. Information sheets, charts, illustrations and pictures are included to assist the reader in understanding the materials presented.

5. Ziegler, P. Thomas. Ninth Edition. The Meat We Eat. Danville, Illinois: The Interstate Printers and Publishers, Inc. 1966, pp. 284-298.

Ziegler discusses briefly information needed to assist one in acquiring skills as a pork butcher.

UNITS SPECIFIC TO FISH PROCESSING

Washing, Scaling, Heading and Gutting Fish

Skinning, Filleting and Packaging Fish

WASHING, SCALING, HEADING AND GUTTING FISH

UNIT CONCEPT: Fish are washed, scaled, headed and gutted to assist consumers in purchasing desired high quality meat products and to save cost in shipping.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using facilities of a commercial fish processing plant and/or comparable facilities in the school meat laboratory, manually and mechanically wash various types of fresh fish so that surface slime is completely removed.

2. Manually and mechanically scale various types of fish so that scales are completely removed without damaging the carcasses.

3. Manually and mechanically head various types of fish so that only the head and/or intestines or tail are removed without damaging the carcasses.

4. Manually and mechanically gut various types of fish so that the intestines are completely removed without damaging the carcasses.

B. INSTRUCTIONAL AREAS

1. Washing fresh fish

   a. Washing fish manually

      (1) Adjusting water temperature
      (2) Measuring and mixing washing solutions
      (3) Determining length of time for leaving fish in washing solutions
      (4) Rinsing fish
      (5) Protecting fish carcasses from contamination after washing and rinsing processes

         (a) Washing and sanitizing work tables and floors
         (b) Draining fish properly after washing and rinsing

b. Washing fish mechanically

(1) The basic operating features of various types of washing equipment and their functions
(2) Adjusting water temperature
(3) Measuring and mixing washing solutions
(4) Checking washing equipment for correct water temperature and amount of water
(5) Adjusting time for washing and rinsing
(6) Protecting fish carcasses from contamination

(a) Washing and sanitizing washing equipment and floors
(b) Draining wash and rinse water

2. Scaling fresh fish

a. Manually scaling fish

(1) Selecting scaling tools
(2) Holding fish and determining where to start the scaling process
(3) Preventing damage to the carcass
(4) Washing and sanitizing work tables and floors to prevent carcass contamination

b. Scaling fish mechanically

(1) The basic operating features of various types of scaling equipment
(2) Identifying major parts of various types of fish scaling equipment and their functions
(3) Using correct procedures for scaling fish

(a) Adjusting machine for scaling various types of fish
(b) Feeding scaling machine
(c) Preventing damages to fish
(d) Checking equipment for proper scaling

(4) Washing and sanitizing scaling equipment and work area

3. Heading fish

a. Heading fish manually

(1) Selecting heading tools
(2) Determining where to head various types of fish to prevent carcass damage
(3) Sharpening heading tools
(4) Storing fish heads
(5) Washing and sanitizing fish heading table and work area

b. Heading fish mechanically

(1) The basic operating features of various types of heading equipment
(2) Identifying major parts of various types of fish heading equipment and their functions
(3) Using correct procedures for mechanically heading fish

(a) Adjusting equipment for heading various types of fish
(b) Feeding heading equipment
(c) Checking equipment for proper heading so that minimum damage or waste to carcass occurs

(4) Washing and sanitizing heading equipment and work areas

4. Cutting fish

a. Gutting fish manually

(1) Selecting gutting tools
(2) Determining where to make initial cut for opening carcass
(3) Removing and storing the internal edible and inedible parts
(4) Cleaning out and washing the belly cavity
(5) Washing and sanitizing gutting tools, tables and floors to prevent carcass contamination

b. Gutting fish mechanically

(1) The basic operating features of various types of gutting equipment
(2) Identifying major parts of various types of fish gutting equipment and their functions
(3) Using correct procedures for mechanically gutting fish

(a) Adjusting equipment for gutting various types of fish

(b) Placing fish on gutting equipment
(c) Checking equipment for proper gutting so that internal parts are removed without damaging the carcasses
(d) Removing internal parts by hand which are missed by gutting equipment
(e) Storing edible and inedible parts

(4) Washing fish after gutting

(a) Adjusting water temperature
(b) Determining length of time for washing

(5) Washing and sanitizing gutting equipment and work areas to prevent contamination

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. Visit a fresh fish processing plant in the local area. Have students examine fish which have not been washed and those which have been mechanically washed. Have several of the students discuss the difference between the fish.

2. Obtain fresh fish from a fish market in the local area. Have each student in the class demonstrate and explain how fish should be scaled. The other students in the class should evaluate the student's scaling in terms of tool selection, time for scaling a given fish, and complete removal of scales.

3. Use the chalk board and have each student in the class draw several types of fish from pictures taken from references. The students should indicate in their drawings where fish should be headed and explain why the head should be removed at the chosen areas.

4. Visit a fresh fish processing plant and have each student verbally explain the basic principles of operation of various types of mechanical fish gutting equipment. The other students in the class should evaluate the student in terms of the correct explanation and should raise questions concerning the operation.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Give each student several fish to be washed. The student must manually wash the fish so that they will be safe for human consumption as well as attractive to consumers. The teacher or cooperating supervisor must evaluate the student for complete removal of slime and time taken for washing, based on entry level skills needed for entering the fresh fish processing industry.

2. Give each student several fresh fish to be scaled. The students must be capable of scaling fresh fish so that they satisfy plant scaling requirements. The teacher or cooperating supervisor must evaluate the students on scale removal and time required for scaling several fish, based on entry level skills needed for entering the fresh fish processing industry.

3. Give each student several fresh fish and tools for manually heading them. The students must be able to sharpen fish heading tools so that the heading process is easily performed, and head several fish with minimum damage to the carcass. The teacher or cooperating supervisor must evaluate the students on sharpening and heading techniques as well as time needed for sharpening tools and heading the fish, based on entry level skills needed for entering the fresh fish processing industry.

4. Give each student several fresh fish to be gutted. The students must be capable of manually gutting fresh fish with minimum damage to carcass and complete removal of all intestines. The teacher or cooperating supervisor must evaluate the students on time and accuracy of gutting, based on entry level skills needed for entering the fresh fish processing industry.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Fish processing plant and/or comparable facilities in the school meat laboratory

2. Various kinds of fresh fish

3. Mechanical fish washing, scaling, heading, and gutting equipment

4. Manual fish scaling, heading, and gutting knives

5. Metal tables

6. Sharpening stone

7. Hard hats, aprons, rubber boots

8. Brooms, brushes, pails

F. EXAMPLES OF SUPPORTING REFERENCES

1. Fish Handling and Processing. New York, New York: Chemical Publishing Company, Inc. 1967, 390 pages.

   This reference book includes the technical information needed by persons desiring to enter the fish processing industry. The information presented in the book is highly technical; however, the basic concepts can be comprehended by high school vocational agriculture students.

2. Joslyn, Maynard A. and Heid, J. L. Food Processing Operations - Their Management, Machines, Materials, and Methods. Westport, Connecticut: The AVI Publishing Company, Inc. 1963, pp. 569-599.

   This section of the book covers procedures involved in processing seafoods.

SKINNING, FILLETING AND PACKAGING FISH

UNIT CONCEPT: Fish are skinned, filleted, and packaged to provide consumers with products which are practically prepared for cooking and free of bones. This processing also assists in preserving the product while being shipped or stored in frozen meat counters.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using facilities of a fish processing plant and/or comparable facilities in the school meat laboratory, manually and mechanically skin various types of fish which require skinning so that the skin is completely removed without damaging the carcass.

2. Manually and mechanically fillet various types of fish so that bones are completely removed, the correct sizes and lengths are cut, and maximum use is made of fish carcasses.

3. Manually and mechanically pack various types of fish so that the products are properly packed in ice or frozen containers and attractive to consumers.

B. INSTRUCTIONAL AREAS

1. Skinning fish

   a. Manually skinning fish

      (1) Sharpening skinning tools

         (a) Using various types of sharpening equipment
         (b) Learning safety procedures to follow to protect workers
         (c) Preventing damage to sharpening equipment and skinning tools

      (2) Identifying external parts to various types of fish

(a) Observing the head structure
(b) Recognizing the structures of fins and tail

(3) Removing the skin (if applicable) of various types of fish

(a) Making correct initial incision
(b) Preventing damage to carcasses caused by deep cuts
(c) Preventing contamination of the fish carcasses after skinning

b. Using mechanical equipment to skin fish

(1) The basic operating features of various types of fish skinning equipment
(2) Identifying major parts of various types of fish skinning equipment and their functions
(3) Using correct procedures for skinning fish

(a) Adjusting equipment for skinning various types of fish
(b) Feeding fish skinning equipment
(c) Checking fish skinning equipment for correct skinning
(d) Preventing damages to fish carcasses
(e) Protecting workers

c. Storing fish skins

d. Washing and sanitizing skinning tools and equipment

(1) Adjusting water temperature
(2) Measuring and mixing washing and sanitizing solutions

e. Washing down floors

2. Filleting fish

a. Manually filleting fish

(1) Sharpening filleting tools

(a) Using various types of sharpening equipment
(b) Preventing injuries to workers

(c) Preventing damage to sharpening equipment and filleting tools

(2) Identifying fish parts

(a) Recognizing the bone structure of various types of fish carcasses
(b) Recognizing the muscle structure of various types of fish carcasses

(3) Using hand tools for filleting fish

(a) Locating and making initial cuts
(b) Cutting off parts from the carcass according to plant requirements
(c) Preventing excessive damage to the carcass and the filleted parts
(d) Protecting workers

b. Using mechanical equipment to fillet fish

(1) The basic operating features of various types of fish filleting equipment
(2) Identifying major parts of various types of fish filleting equipment and their functions
(3) Using correct procedures for filleting fish

(a) Adjusting equipment for filleting various types of fish
(b) Placing fish on filleting equipment
(c) Checking equipment for desired filleting
(d) Preventing damages to fish carcasses
(e) Protecting workers

c. Storing bone structures after filleting

d. Washing and sanitizing filleting tools and mechanical equipment

(1) Adjusting water temperatures
(2) Measuring and mixing washing and sanitizing solutions

e. Washing down floors

3. Packaging fish

a. The basic operating features of fish packaging equipment

b. Operating fish packaging equipment

(1) Keeping package containers in machine
(2) Checking products for correct packaging
(3) Preventing damage to the products

4. Packing fish

a. Selecting containers

b. Placing ice in containers

c. Placing fish in containers

d. Closing containers

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. Have each student skin three catfish. The student should present the best skinned catfish to the teacher for evaluation. The teacher should evaluate the catfish for complete removal of skin and damage to carcass.

2. Visit a fish processing plant and have students examine fish parts which have been filleted by mechanical filleting equipment. Several of the students should verbally explain the filleting operation in terms of correct size of filleted parts and damages. The plant supervisor should also make a verbal analysis of the operation after the students.

3. a. Have each student package several individual units of various types of fish with the use of fish packaging equipment. While each student is packaging fish, the other students should evaluate the fish package for tightness and time taken for packaging.

b. Obtain fish from the local area and have students pack two boxes of filleted fish. One box of filleted fish should be packed in ice loosely with ice only at the top of the container. A second box of fish should be packed in ice tightly with ice at the top and bottom of the container. The two boxes should be left in a warm room for twenty-four hours. After this time, the students should examine the condition of the filleted fish in the two boxes and verbally explain possible causes for the conditions of the filleted fish. Recommendations should be made for improving these conditions.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Have each student select appropriate tools and manually skin fish so that the skin is completely removed without damaging the carcass. The teacher or supervisor should evaluate the students on tool selection, complete removal of skin, time for removing skin, and damage to carcass, based on entry level skills needed for entering the fish processing industry.

2. Have students manually fillet various types of fish so that correct sizes and lengths are cut, they are attractive to consumers, and the fish carcasses are used to the maximum. The teacher or supervisor should evaluate the student on his ability to accomplish the above as well as time taken for the process.

3. a. Given several fish to be packaged with fish packaging equipment, the student must be capable of packaging fish so that air and other materials do not come into contact with the fish carcasses and the containers are attractive to consumers. The teacher or supervisor should evaluate the students on tightness of package, condition of package, and time taken for completion.

   b. Have students manually pack filleted fish in ice and boxes so that fish will keep longer and are attractive to consumers when bought at local fish markets. The teacher or supervisor should evaluate students for tightness of pack, arrangement of ice, and time taken for packing.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Fish processing plant and/or comparable facilities in the school meat laboratory

2. Various kinds of fish

3. Hard hats, rubber boots

4. Mechanical fish skinning equipment, filleting equipment, and packaging equipment

5. Fish boxes

6. Ice

7. Fish skinning and filleting tools

8. Cleansers and sanitizers, brooms, brushes, pails

F. EXAMPLES OF SUPPORTING REFERENCES

1. Fish Handling and Processing. New York, New York: Chemical Publishing Company, Inc. 1967, 390 pages.

   This reference book includes the technical information needed by persons desiring to enter the fish processing industry. The information presented in the book is highly technical; however, the basic concepts can be comprehended by high school vocational agriculture students.

2. Joslyn, Maynard A. and Heid, J. L Food Processing Operations - Their Management, Machines, Materials, and Methods. Westport, Connecticut: The AVI Publishing Company, Inc. 1963, pp. 569-599.

   This section of the book covers procedures involved in processing seafoods.

UNITS SPECIFIC TO POULTRY PROCESSING

Grading Live Poultry

Shackling, Stunning and Bleeding Poultry

Preparing Poultry Carcasses for the Cooler

Cutting Up, Chilling and Packaging Poultry

Grading Dressed Poultry

Cleaning and Sanitizing Tools and Equipment Used in Processing Poultry

GRADING LIVE POULTRY

UNIT CONCEPT: Poultry varies considerably in health, body conformation and amount of muscling and fat. Standards which define the marketing characteristics of groups of live poultry are valuable in determining if flocks are ready for market and the purposes for which they are to be used.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using various species of live poultry, rank the birds according to body quality and use, consistent with U.S. Department of Agriculture (USDA) grading standards.

B. INSTRUCTIONAL AREAS

1. Identifying various species of poultry by their physical characteristics
   a. Observing feather colors
   b. Observing head characteristics
   c. Observing body conformation
   d. Observing leg and shank
2. Identifying USDA and/or state grades and their characteristics
   a. Determining various classes of poultry by considering age, sex, weight, and intended use
   b. Identifying the anatomy and physiology of birds to understand the connection between structure and certain grading factors
3. Using suggested procedures for grading live market birds
   a. Examining birds from a distance for health and vigor

b. Removing birds from cage and checking general conformation, back and breast

c. Checking flesh by feeling breast bone, legs, etc.

d. Checking fat covering by noting the area where the wings join the body

e. Checking for pin feathers, bruises, broken bones, blisters, and other faults

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. a. Visit a poultry farm where a USDA and/or state grader is grading poultry and have him demonstrate to the class how poultry grading should be performed. Students should be given the opportunity to ask questions.

b. Visit several local poultry farms (turkeys, chickens, ducks, etc.) and have a responsible person identify and arrange several types of poultry into groups of six birds. Students should place the birds in each group according to their grade and verbally explain their grading.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Given various types of poultry to be graded, the student should verbally give reasons for giving birds certain grades. The teacher should evaluate students on accuracy of grading and their reasons for giving certain grades.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Poultry (turkeys, chickens, ducks, geese, guineas, pigeons) on the school farm, poultry meat processing plant and/or local poultry farms

2. Hard hats and rubber boots

F. EXAMPLES OF SUPPORTING REFERENCES

SHACKLING, STUNNING AND BLEEDING POULTRY

UNIT CONCEPT: Proper shackling, stunning and bleeding of poultry are the first major processing steps in providing an efficient poultry plant operation and a more attractive poultry meat product for the consumer.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using facilities of a poultry meat processing plant and/or comparable facilities in the school meat laboratory, shackle various types of poultry, within a time period acceptable for entry level employment in the poultry meat processing industry. A student should also be able to determine possible shackling problems and change parts to the shackling equipment when processing various types of poultry.

2. Given poultry to be stunned, select and apply stunning techniques to various types of birds to assist in the bleeding process, within a time period acceptable for entry level employment in the poultry meat processing industry.

3. Given shackled and/or stunned poultry to be bled, properly bleed birds so that blood does not clot on sections of the carcass, within a time period acceptable for entry level employment in the poultry meat processing industry.

B. INSTRUCTIONAL AREAS

1. Shackling poultry

   a. Identifying the basic operating features of shackling equipment

   b. Identifying major parts of shackling equipment and their functions

   c. Selecting the type of equipment to use for shackling various types of poultry

d. Using correct procedures for shackling poultry

e. Changing shackles for processing various types of poultry

2. Preparing poultry for bleeding

a. Identifying the basic operating features of various types of stunning equipment and methods of stunning various kinds of poultry

b. Selecting stunning equipment and methods for stunning various types of poultry

c. Using correct equipment, methods and procedures for stunning poultry

(1) Operating a carbon dioxide chamber
(2) Using the electrically charged bleeding knife

(a) Adjusting voltage
(b) Determining placement of the equipment for stunning
(c) Timing the electrical stunning

(3) Injecting poultry with drugs
(4) Feeding poultry tranquilizers

d. Using safe practices while preparing poultry for bleeding

(1) Preventing injuries to workers
(2) Preventing damage to stunning equipment
(3) Preventing excessive damage to carcass

3. Bleeding poultry

a. Understanding the importance of properly bleeding various types of poultry

b. Identifying and selecting tools for bleeding various types of poultry

c. Using correct tools, methods and procedures for bleeding various types of poultry

(1) Determining and allowing enough time for bleeding

(2) Preventing excessive damage to the carcass
(3) Preventing injuries to workers
(4) Preventing damage to bleeding tools

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. Divide the students into groups of three. Each student in the group should take turns selecting and securing appropriate shackles, and shackling birds. The students should evaluate each other on shackle selection, proper arrangement and time for shackling the poultry.

2. Divide students into groups of three. Each student in the group should take turns in stunning turkeys with an electrical stunner. The students should evaluate each other on accuracy and time taken for stunning.

3. Divide the students into groups of three. Each student in the group should take turns sharpening the bleeding knife. The students should evaluate each other on the sharpness and time taken for sharpening.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Use a poultry meat processing plant and/or comparable facility in the school meat laboratory. With different poultry to be shackled, each student must shackle the birds so that they are properly secured and arranged, to assist in the bleeding and other processing activities. The teacher or cooperating supervisor (co-op programs) should evaluate each student for arrangement of birds on shackles and time taken for shackling, based on entry level skills needed for employment in the poultry meat processing industry.

2. The student must be capable of stunning poultry so that the muscles are relaxed for proper bleeding. The teacher or cooperating supervisor should evaluate each student for accuracy, techniques and time taken for stunning, based on entry level skills needed for employment in the poultry meat processing industry.

3. Each student should select a knife and properly bleed poultry so that blood does not clot on the carcasses. The teacher or cooperating supervisor should evaluate each student for knife selection,

effectiveness, and time taken for bleeding, based on entry level skills for employment in the poultry meat processing industry. A similar evaluation should be done with all students.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. School meat laboratory and/or poultry meat processing plants
2. Various types of poultry (chickens, ducks, geese, turkeys)
3. Electric stunner
4. Poultry bleeding knife
5. Electric sharpener
6. Hard hats, rubber boots, plastic aprons

F. EXAMPLES OF SUPPORTING REFERENCES

1. Poultry Processing Plant Employee. College Station, Texas: Vocational Instructional Services, Texas A & M University.

   This reference discusses the knowledge needed to work in poultry meat processing. General questions and answers concerning the poultry processing industry are included.

2. Winter, A. R. and Funk, E. M. Poultry Science and Practice. Chicago, Illinois: J. B. Lippincott Company. 1960, pp. 393-396.

   This reference book covers information and skills required to work efficiently in the poultry processing plant. A major portion of the book covers technical information needed for producing and marketing poultry products.

PREPARING POULTRY CARCASSES FOR THE COOLER

UNIT CONCEPT: Properly scalded, picked, singed and eviscerated poultry provide consumers with desirable, high quality meat products which are free of feathers, pin feathers, contamination and inedible parts.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using facilities of a poultry meat processing plant and/or comparable facilities in the school meat laboratory, scald various types of poultry to the degree that feathers can be easily removed when picking without damaging the carcasses.

2. Using mechanical picking equipment, pick the various types of scalded poultry so that feathers are completely removed and the carcasses are not damaged.

3. Using singeing equipment, singe various types of picked poultry so that pin feathers are completely removed without scorching the skin.

4. Using equipment typical of poultry meat processing plants, eviscerate various types of poultry so that carcasses and edible parts are not damaged to the point of lowering market value.

B. INSTRUCTIONAL AREAS

1. Scalding poultry

   a. Identifying the basic operating features of various types of scalding equipment

   b. Identifying major parts of poultry scalding equipment and their functions

   c. Determining possible causes for poor picking and/or damage to poultry carcasses.

d. Using correct procedures for scalding poultry

(1) Adjusting water temperature depending upon the type and age of the poultry
(2) Determining length of time for scalding depending on type and age of poultry
(3) Checking poultry for loosening of feathers
(4) Preventing poultry body damages

2. Picking poultry

a. The basic operating features of various types of poultry picking equipment

b. Identifying major parts of various types of poultry picking equipment and their functions

c. Determining possible causes for poor picking and/or damage to poultry carcasses

d. Removing the feathers

(1) Preventing damages to poultry carcasses
(2) Checking for proper removal of feathers

e. Making adjustments on picking equipment

3. Singeing poultry

a. The basic operating features of various types of poultry singeing equipment

b. Identifying major parts of various types of poultry singeing equipment and their functions

c. Removing pin feathers

(1) Preventing damages to poultry carcasses
(2) Checking for proper removal of pin feathers

d. Making adjustments on singeing equipment

4. Removing and handling certain edible and inedible parts before eviscerating poultry

a. Selecting tools for removing edible and inedible parts

b. Removing and storing the head

c. Removing and storing the feet

d. Removing and storing the oil gland at the base of the tail

5. Eviscerating edible and inedible parts

a. Selecting tools for opening the carcass and eviscerating edible and inedible parts

b. Removing the crop, gullet and trachea

c. Opening the body cavity

d. Removing internal edible and inedible parts from body cavity

6. Caring for edible and inedible parts

a. Washing and storing internal edible parts

b. Storing inedible parts

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. Have each student examine a scalded fryer for loosening of feathers and body damages; each should make written recommendations for increasing, lowering or maintaining water temperature and the rationale used for such recommendations. Several of the students should read their recommendations and rationales to the class and the teacher should make recommendations and discuss them in detail.

2. Divide the students into small groups and have the individual groups pick turkeys. The teacher should evaluate the turkeys picked by each group based on complete removal of feathers, time taken for feathering and body condition.

3. Divide students into groups of three. Using a hand singer, students in the group should take turns singeing a duck. While each student is singeing the duck, the other students should evaluate him on the techniques used, removal of all hairlike feathers and time taken for singeing.

4. Visit a poultry meat processing plant and have students verbally identify the edible and inedible parts of various types of poultry.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. The students must examine several birds which have been scalded to determine if feathers are easily removed and observe the skin condition for blotches, unsightly patches and discoloring. The student should be evaluated upon his verbal recommendations to the teacher or cooperating supervisor in terms of lowering, increasing, or maintaining water temperature for scalding additional poultry.

2. Given several scalded birds to be picked, the student must pick poultry with the use of a mechanical picker so that feathers are completely removed. The teacher or cooperating supervisor must evaluate the student's picking ability on complete removal of feathers, condition of carcasses, and time taken for picking.

3. Given several birds to be singed, the student must singe poultry with the use of a hand singer so that all pin feathers are removed and the carcasses are attractive to consumers. The teacher or cooperating supervisor must evaluate the student on complete removal of hairlike feathers, minimum damage to carcasses and time taken for singeing individual birds.

4. Given poultry to be eviscerated, the student must select tools and eviscerate poultry by removing edible and inedible parts without damage to the carcass or to the parts. The student should be evaluated on his ability to open carcasses with minimum damage and the time taken to eviscerate individual birds.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Poultry meat processing plant and/or comparable facilities in the school meat laboratory

2. Different types of poultry (chickens, ducks, geese, turkeys, etc.)

3. Poultry scalding equipment

4. Poultry picking equipment

5. Poultry singeing equipment

6. Poultry carcass splitting knives

7. Shears for removing head and feet

8. Lung or kidney remover

9. Electric sharpener

10. Plastic aprons, hard hats, rubber boots

F. EXAMPLES OF SUPPORTING REFERENCES

1. Meat Processing Plant Employee. College Station, Texas: Vocational Instructional Services, Texas A & M University.

   This reference discusses the knowledge needed to work efficiently in processing plants as well as meat departments in grocery stores.

2. Winter, A. R. and Funk, E. M. Poultry Science and Practice. Chicago, Illinois: J. B. Lippincott Company. 1960, pp. 393-396.

   This reference book includes knowledge and skills required to work efficiently in the poultry processing plant. A major portion of the book covers technical information needed for producing and marketing poultry products.

CUTTING UP, CHILLING AND PACKAGING POULTRY

UNIT CONCEPT: Properly cut up, chilled and packaged poultry meat products provide attractive meat products for consumers and prevent spoilage while products are being shipped and displayed.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using facilities of a commercial meat cutting department and/or comparable facilities in the school meat laboratory, manually and mechanically cut up the various poultry carcasses into the prescribed parts with minimum damage to the carcasses so that the parts are attractive to consumers.

2. Given poultry carcasses to be chilled, chill various types of poultry so that they will not spoil during shipping or when being displayed in meat counters.

3. Use various types of wrapping and packaging equipment to wrap and pack various types of poultry meat products so that the products are not exposed to air and are attractive to consumers.

B. INSTRUCTIONAL AREAS

1. Cutting up poultry

   a. Manual poultry cutting procedures

      (1) Identifying poultry parts

         (a) Recognizing the bone structure of different types of poultry carcasses
         (b) Recognizing the muscle structure of different types of poultry carcasses

      (2) Using hand tools for cutting up poultry
      (3) Locating and making cuts for removing wings from the breast

(4) Locating and making cuts for removing the breast from the thighs and backbone
(5) Locating and making cuts for removing the thighs from the backbone
(6) Separating the legs from the thighs

b. Cutting up poultry mechanically

(1) The basic operating features of various types of poultry cut up machines
(2) Identifying major parts of various types of poultry cut up machines and their functions
(3) Determining possible causes for damage to parts when cutting up poultry carcasses
(4) Using correct procedures for cutting up poultry

(a) Adjusting machine for cutting up various types of poultry
(b) Feeding cut up machine
(c) Preventing damage to poultry parts
(d) Preventing injuries to workers

2. Chilling poultry

a. The basic operating features of various types of poultry chilling equipment

b. Identifying major parts of various types of poultry chilling equipment and their functions

c. Using correct procedures for chilling poultry

(1) Adding chilling materials (cold running water, crushed ice, slush ice, slush ice agitated with compressed pump or in an on-the-line chiller) to different types of chilling equipment
(2) Checking chilling temperature required by U.S. Department of Agriculture (USDA)
(3) Placing poultry in the chilling equipment
(4) Examining poultry for proper chilling
(5) Preventing damage to poultry carcasses

3. Packaging poultry meat products

a. The basic operating features of poultry meat packaging equipment

b. Operating poultry meat packaging equipment

(1) Keeping package containers in machine
(2) Packaging and checking packaged products for proper sealing
(3) Preventing damage to products

4. Wrapping poultry meat products

a. The basic operating features of poultry meat wrapping equipment

b. Operating poultry meat wrapping equipment

(1) Putting wrapping paper in the machine
(2) Wrapping and checking poultry meat products for proper sealing

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. Visit the mechanical cut up department in a local poultry meat processing plant and have all students observe the entire cut up operation. Have several students explain the basic principles of operation of different parts of the equipment. While each student is explaining a given part of the equipment, the other students should ask questions to test his understanding of the principles.

2. The teacher should bring two cut up fryers to class and have students chill one fryer with cold water and ice and leave the other wrapped. They should be left in a warm room for four hours. After this time, each student should examine the two fryers and write down their reactions to the demonstration. Have several of the students read their reactions to the class. The teacher should summarize the demonstration.

3. Have each student wrap several turkeys with the use of a meat wrapping machine. While each student is wrapping turkeys, the other students should evaluate the wrapped turkeys for tightness of wrap and time for wrapping individual turkeys.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Have each student select appropriate tools and cut up poultry so

that the individual parts are attractive to consumers. The teacher or cooperating supervisor should evaluate the student for tool selection, accuracy and time taken for cutting up poultry, based on entry level skills needed for entering the poultry meat processing industry.

2. Given poultry to be chilled, each student must be capable of verbally explaining the basic principles of operation of at least one type of poultry chilling equipment and chill several birds to prevent spoilage while being shipped. The teacher or cooperating supervisor must evaluate the student on his ability to explain the basic principles of operation and time required for chilling the poultry.

3. Given several birds to be wrapped with poultry meat wrapping equipment, the student must be capable of wrapping poultry so that air and other materials do not come into contact with the carcasses. The teacher or cooperating supervisor must evaluate the student for tightness of wrap and time taken for wrapping individual birds.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Poultry meat processing plant and/or comparable facilities in the school meat laboratory
2. Various types of poultry (chickens, ducks, geese, turkeys)
3. Mechanical poultry cut up equipment
4. Poultry carcass splitting knives
5. Various types of poultry meat chilling equipment
6. Poultry meat packaging equipment
7. Poultry meat wrapping equipment
8. Electric sharpener
9. Poultry meat cutting tables
10. Hard hats, rubber boots, plastic aprons

F. EXAMPLES OF SUPPORTING REFERENCES

1. Meat Processing Plant Employee. College Station, Texas: Vocational Instructional Services, Texas A & M University.

This reference discusses the knowledge needed to work efficiently in processing plants as well as in meat departments of grocery stores.

2. Winter, A. R. and Funk, E. M. Poultry Science and Practice. Chicago, Illinois: J. B. Lippincott Company. 1960, pp. 393-396.

This reference book includes information and skills required to work efficiently in the poultry processing plant. A major portion of the book covers technical information needed for producing and marketing poultry products.

GRADING DRESSED POULTRY

UNIT CONCEPT: Dressed poultry are graded to determine the quality of carcass as well as maximum use and price before being purchased by consumers.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Given various types of poultry carcasses, identify market classes of birds in regard to species, age and sex, so this information will assist him in ranking the carcasses according to body quality and condition.

2. Given various types of poultry carcasses, identify the characteristics which would lower their carcass grades.

3. Considering U.S. Department of Agriculture (USDA) and state grades of various types of poultry carcasses, rank birds according to their body quality and condition.

B. INSTRUCTIONAL AREAS

1. Identifying poultry market classes

   a. Classifying poultry according to their species

   b. Classifying various poultry species according to sex

   c. Classifying various poultry species according to age

2. Determining body condition and quality for various types of poultry carcasses

   a. Checking the carcass for undesirable conditions

      (1) Protruding pinfeathers
      (2) Bruises requiring trimming
      (3) Incompletely removed lungs or sex organs

(4) Parts of the trachea
(5) Vestigal feathers
(6) Feathers
(7) Extraneous materials of any type inside or outside of the carcass (fecal material, blood, etc.)

b. Checking carcass quality

(1) Thickness of conformation
(2) Firmness of flesh
(3) Amount of fat covering
(4) Pinfeathers in the carcass
(5) Exposed flesh resulting from cuts, tears, and broken bones
(6) Discoloration of skin and flesh blemishes and bruises
(7) Freezer damage to the carcass

3. Using suggested procedures for ranking dressed poultry

a. Determining classes of meat

b. Checking conformation, back and legs, wings

c. Checking the fleshing

d. Observing the fat covering

e. Examining for pinfeathers

f. Examining carcass for cuts and tears

g. Checking for discoloration

h. Ranking birds according to body quality and condition

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. Visit a poultry meat processing plant and have students verbally identify various carcasses by their common names.

2. Have students examine several poultry carcasses which have been damaged during processing. Students should explain to each other what should have been done to eliminate the problems and what impact the damaged carcasses would have had on a business if they had been displayed in a meat counter.

3. Visit a poultry processing plant where a USDA grader is grading poultry carcasses. The grader should explain to students how to grade carcasses and reasons for giving certain grades.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Visit a poultry processing plant and have students identify various species of dressed poultry by writing down their common names.

2. Obtain and identify five damaged fryers, and have students examine and list visible defects on them.

3. The teacher should obtain several fryers and arrange them into groups of four. Each student in the class should rank the fryers according to body quality and condition, and record the placement on paper or score cards. The students should verbally give their reasons for placing carcasses.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. School meat laboratory and poultry meat processing plant

2. Various types of poultry carcasses

3. Hard hats and rubber boots

F. EXAMPLES OF SUPPORTING REFERENCES

1. Mountney, George J. Poultry Products Technology. Westport, Connecticut: The AVI Publishing Company, Inc. 1966, pp. 38-40.

This reference book covers the technical knowledge needed for working in poultry processing plants. Information relating to grading dressed poultry covers the noted pages.

2. Poultry Grading Manual. Agriculture Handbook No. 31. Washington, D.C.: Consumer and Marketing Service, U.S. Department of Agriculture. 1971, 38 pages.

This reference includes technical knowledge needed for grading live and processed poultry. Diagrams and black and white pictures are also included for better understanding of the descriptions.

1. Mountney, George J. Poultry Products Technology. Westport, Connecticut: The AVI Publishing Company, Inc. 1966, pp. 36-38.

This reference book covers the technical knowledge needed for working in poultry processing plants. Information relating to grading live poultry covers only two pages.

2. Poultry Grading Manual. Agriculture Handbook No. 31. Washington, D.C.: Consumer and Marketing Service, U.S. Department of Agriculture. 1971, 38 pages.

This reference includes technical knowledge needed for grading live and processed poultry. Diagrams and black and white pictures are also included for better understanding of the descriptions.

CLEANING AND SANITIZING TOOLS AND EQUIPMENT USED IN PROCESSING POULTRY

UNIT CONCEPT: Tools and equipment used in processing poultry must be cleaned and sanitized according to plant sanitation standards as well as local, state and federal Public Health Service standards to prevent product contamination.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using facilities in the school laboratory and/or poultry processing plant, clean and sanitize tools used for processing poultry so that these processes meet the approval of the teacher or cooperating supervisor.

2. Clean and sanitize equipment used for processing poultry so that these processes meet the approval of the teacher or cooperating supervisor.

B. INSTRUCTIONAL AREAS

1. Using sanitation procedures for cleaning and sanitizing tools used for processing poultry

   a. Selecting, measuring and mixing cleansers according to manufacturer's directions

   b. Selecting, measuring and mixing sanitizers according to manufacturer's directions

   c. Collecting and rinsing the following tools:

      (1) Shackles
      (2) Bleeding knives
      (3) Eviscerating knives
      (4) Cut-up knives

   d. Cleaning and sanitizing the following tools:

(1) Shackles
(2) Bleeding knives
(3) Eviscerating knives
(4) Cut-up knives

e. Storing the following tools:

(1) Shackles
(2) Bleeding knives
(3) Eviscerating knives
(4) Cut-up knives

f. Using safety practices in cleaning and sanitizing tools used for processing poultry

(1) The use of cleaners and sanitizers
(2) Handling bleeding and cut-up knives
(3) Handling shackles

2. Using sanitation procedures for cleaning and sanitizing equipment used in processing poultry

a. The scalding equipment

(1) Disconnecting parts which require manual cleaning and sanitizing
(2) Selecting, measuring and mixing cleansers
(3) Removing feathers in scalding tanks and rinsing out the tank
(4) Cleaning scalding equipment
(5) Checking drainage in the scalding tank and work areas
(6) Selecting, measuring and mixing sanitizers
(7) Sanitizing scalding equipment
(8) Cleaning and sanitizing parts requiring manual cleaning and sanitizing
(9) Replacing parts requiring manual cleaning and sanitizing

b. The picking equipment

(1) Disconnecting parts which require manual cleaning and sanitizing
(2) Removing feathers in the picking equipment, and rinsing
(3) Selecting, measuring and mixing cleansers
(4) Cleaning picking equipment

(5) Checking floor drainage in the picking area
(6) Selecting, measuring and mixing sanitizers
(7) Sanitizing picking equipment
(8) Cleaning and sanitizing parts requiring manual cleaning and sanitizing
(9) Replacing parts requiring manual cleaning and sanitizing

c. The washing equipment and cut-up equipment

(1) Disconnecting parts which require manual cleaning and sanitizing
(2) Removing undesirable parts and materials from the washing and cut-up equipment by rinsing
(3) Selecting, measuring and mixing cleansers
(4) Cleaning washing and cut-up equipment
(5) Checking floor drainage in the washing and cut-up area
(6) Selecting, measuring and mixing sanitizers
(7) Sanitizing washing and cut-up equipment
(8) Cleaning and sanitizing parts requiring manual cleaning and sanitizing
(9) Replacing parts requiring manual cleaning and sanitizing

d. The equipment used for chilling and wrapping poultry carcasses

(1) Disconnecting parts which require manual cleaning and sanitizing
(2) Removing undesirable parts and materials from the chilling and wrapping equipment
(3) Selecting, measuring and mixing cleansers
(4) Cleaning chilling and wrapping equipment
(5) Checking floor drainage in the chilling and wrapping area
(6) Selecting, measuring and mixing sanitizers
(7) Sanitizing chilling and wrapping equipment
(8) Cleaning and sanitizing parts requiring manual cleaning and sanitizing
(9) Replacing parts requiring manual cleaning and sanitizing

3. Cleaning areas where poultry products are processed

a. Preparing work areas for washing down

(1) Arranging equipment and removing obstacles
(2) Checking areas for proper drainage

b. Washing down work areas

(1) Using water hoses for rinsing and washing
(2) Using brooms for scrubbing

c. Storing equipment used for cleaning work areas

(1) Placing water hoses in desired area
(2) Storing brooms and pails

4. Servicing equipment according to manufacturer's specifications

a. The shackling equipment

(1) Identifying parts requiring servicing
(2) Using servicing records
(3) Using servicing manuals
(4) Servicing the equipment

b. The scalding equipment

(1) Identifying parts requiring servicing
(2) Using servicing records
(3) Using servicing manuals
(4) Servicing the equipment

c. The picking equipment

(1) Identifying parts requiring servicing
(2) Using servicing records
(3) Using servicing manuals
(4) Servicing the equipment

d. The washing and cut-up equipment

(1) Identifying parts requiring servicing
(2) Using servicing records
(3) Using servicing manuals
(4) Servicing the equipment

e. The chilling and wrapping equipment

(1) Identifying parts requiring servicing
(2) Using servicing records
(3) Using servicing manuals
(4) Servicing the equipment

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. Obtain shackles and knives used in poultry processing plants and have students clean the tools with cleaning solutions and brushes.

2. Using the poultry scalding equipment in the school laboratory or poultry slaughtering plant, divide students in groups of two and have students clean sections to the scalding equipment.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Given knives used in processing poultry, the student must be able to measure and mix cleaning solutions according to manufacturer's directions and clean knives so that they meet the approval of the teacher or cooperating supervisor.

2. Given the picking equipment, the student must be able to clean the equipment so that it meets the approval of the teacher or cooperating supervisor.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Poultry processing plant in the school laboratory and/or commercial poultry meat processing

2. Tools used in processing poultry: bleeding knives, eviscerating knives, cut-up knives, shackles, and similar equipment

3. Equipment used in processing poultry: shackling equipment, scalding equipment, picking equipment, washing equipment, cut-up equipment, and similar equipment

4. Poultry processing plant servicing equipment

5. Cleansers and sanitizers, brooms, brushes, pails

6. Hard hats and rubber boots

F. EXAMPLES OF SUPPORTING REFERENCES

1. Guthrie, Rufus F. Food Sanitation. Westport, Connecticut: The AVI Publishing Company, Inc. 1972, pp. 94-129.

This section of the book includes general information for maintaining sanitation conditions in food processing plants.

III

DAIRY (MILK) PRODUCTS

U.S.O.E. CODE 01.04 01 02 00

Receiving and Storing Raw Milk

Cleaning and Sanitizing Milk Tankers

Clarifying Raw Milk

Pasteurizing Raw Milk

Homogenizing Milk

Cooling Processed Milk

Packaging and Storing Processed Milk

Cleaning and Sanitizing Dairy Equipment

RECEIVING AND STORING RAW MILK

UNIT CONCEPT: A dairy plant worker must be proficient in weighing, sampling, and transferring raw milk. It is his responsibility to assist in determining quantity and quality of the milk upon arrival. In order to maintain quality of the raw milk before processing, he must also be able to cool and store the milk properly.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Weigh tankers without error so that the quantity of raw milk received by the plant can be determined.

2. Using a long handled dipper and sanitized containers, collect representative raw milk samples from tankers so that the percent butter fat and quality of the milk received by the plant can be determined.

3. Transfer raw milk from tankers to storage tanks with minimum loss of milk.

4. Properly store raw milk by adjusting temperatures according to plant specifications so that quality of milk is maintained and the milk is ready for processing when needed.

B. INSTRUCTIONAL AREAS

1. Weighing tankers

   a. Identifying major parts to weighing scales and their operating features

   b. Adjusting scales to zero

   c. Placing filled tankers on scales

   d. Reading and recording weights of filled tankers

2. Sampling raw milk

    a. Securing sanitized long handled dippers and glass containers for sampling

    b. Checking tankers to see that the cream is evenly distributed throughout the raw milk

    c. Obtaining representative raw milk samples from tankers

    d. Storing raw milk samples in the quality control laboratory

3. Transferring raw milk

    a. Determining where milk should be transferred

    b. Checking storage tanks for clean and sanitized conditions

    c. Connecting milk hoses to tankers

    d. Operating electrical motors to transfer raw milk from tankers to storage tanks

    e. Turning valves at the storage tanks so that milk will not flow back into the tanker

    f. Disconnecting milk hoses from tankers

4. Storing raw milk

    a. The basic operating features of various types of raw milk storing equipment

    b. Identifying major parts of raw milk storage equipment and their functions

    c. Filling tanks according to plant specifications

    d. Adjusting and recording temperatures

    e. Checking tanks for correct temperatures

    f. Checking tanks for drainage

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. Have students work the following problem. A tanker filled with raw milk placed on a weighing scale reads a total of 14,000 pounds and the tanker empty has been recorded at four tons. Due to minor malfunctions in the scale, the dial starts at the two pound mark rather than zero. What is the actual weight of the raw milk in the tanker?

2. Have students obtain milk samples from a tanker with the use of a long handled dipper, and have the laboratory technician perform butter fat tests. After the samples have been tested for butter fat, the teacher and the students should compare and discuss the results. If there is a significant difference of .5% butter fat in any of the samples, the students should explain possible causes.

3. a. Have students connect and disconnect milk hoses.

   b. Have students practice turning valves at the raw milk storage tanks.

4. Have students adjust temperatures on raw milk storage tanks and verbally explain reasons why temperatures should be lowered or increased in a dairy processing plant.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Given a tanker filled with raw milk, the student must be able to weigh and record weight of tanker so that actual weight of raw milk can be determined.

2. Given a tanker filled with raw milk, the student must be capable of obtaining a representative sample of milk with the use of a long handled dipper so that quality of milk in terms of bacteria and percent butter fat can be accurately determined.

3. The student must be capable of connecting milk hoses to tankers so that milk is not wasted when being transferred from tankers to storage tanks.

4. Given raw milk to be stored at governmental specifications, the student must be able to adjust temperatures on storage tanks and keep raw milk from spoiling over a three hour period of time.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Milk processing plant and/or comparable facilities in the school laboratory

2. Milk tankers

3. Raw milk

4. Scales for weighing tankers

5. Rubber boots, hard hats

6. Long handled dippers and sanitized containers for collecting milk samples

7. Washing and sanitizing solutions

F. EXAMPLES OF SUPPORTING REFERENCES

1. Dairy Industry Plant Training Manual. White Plains, New York: The Personnel Training Manual Preparation Committee, American Dairy Science Association. 1959, pp. 12-14.

   This reference includes trainee assignments and review questions for training persons who desire work in the dairy processing industry.

2. Sommer, Hugo H. Market Milk and Related Products. Milwaukee, Wisconsin: Olsen Publishing Company. 1952, 750 pages.

   This reference includes technical information needed for working in dairy processing plants. Tables, charts and pictures are included to assist one in acquiring the skill needed to work efficiently in the dairy processing industry.

CLEANING AND SANITIZING MILK TANKERS

UNIT CONCEPT: Milk tankers are cleaned and sanitized to assist in maintaining the keeping quality and purity of milk while being transported.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using the clean-in-place system, clean and sanitize milk tankers so that when raw milk is pumped into tankers and transported, the keeping quality is maintained.

B. INSTRUCTIONAL AREAS

1. Manual methods of cleaning and sanitizing milk tankers
   - a. Placing tankers in appropriate area
   - b. Rinsing tanker with desired water temperature
   - c. Preparing cleaning solution
     - (1) Selecting appropriate size plastic or rubber pail
     - (2) Selecting appropriate cleaning solution
     - (3) Measuring and mixing cleaning solution according to manufacturer's directions
   - d. Selecting appropriate brushes
     - (1) Size
     - (2) Shape
   - e. Cleaning the tanker
   - f. Draining the tank
   - g. Cleaning the outside of the tanker

(1) Outlet valve
(2) Dipstick
(3) Agitator blade

h. Rinsing inside and outside of tanker with acidified rinse water to prevent formation of mineral or milk stone deposits

2. Mechanical cleaning and sanitizing

a. Placing tanker in unloading zone so that connections between the clean-in-place system and the tank can be made conveniently

b. Checking to see that the tanker is properly positioned for rapid drainage

c. Determining required time for adequate rinsing

(1) Considering temperature of water
(2) Construction of spray-ball or nozzles
(3) Amount of water pressure
(4) Condition of the inner surface of the tanker

d. Connecting the clean-in-place system to the tank

e. Selecting, measuring and mixing appropriate cleaning solution according to manufacturer's recommendation

f. Filling tank with appropriate temperature of water and cleaning solution so that it covers the outlet valve

g. Operating the mechanical cleaner an appropriate length of time for thorough cleaning of equipment

h. Disconnecting the system and draining the solution into a pail

i. Using appropriate brushes to clean outside tank with cleaning solution

j. Rinsing tank to remove cleaning solutions

k. Rinsing tank with acidified rinse

l. Selecting, measuring and mixing sanitizing solutions according to manufacturer's recommendation

m. Rinsing tank with sanitizing solutions

n. Checking the tank for proper cleaning

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. With the use of a milk tanker and a clean-in-place system, students should practice connecting and disconnecting the system.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Students should manually rinse, wash and sanitize a milk tanker. The teacher or cooperating supervisor should evaluate the student based on the processes used and the final condition of the tank. Thorough removal of all residue and a sanitary finish should be achieved.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Milk tanker

2. Clean-in-place system in a milk processing plant and/or comparable facilities in the school laboratory

3. Hard hats and rubber boots

4. Various types of dairy equipment cleaning detergents

5. Various types of dairy equipment sanitizers

6. Dairy equipment cleaning and sanitizing brushes

7. Rubber and metal pails

F. EXAMPLES OF SUPPORTING REFERENCES

1. Henderson, James Lloyd. The Fluid-Milk Industry. Westport, Connecticut: The AVI Publishing Company, Inc. 1971, pp. 144-145, 197-198.

   These sections include basic concepts needed for effectively cleaning and sanitizing milk tankers.

CLARIFYING RAW MILK

UNIT CONCEPT: Raw milk is clarified at the processing plant to remove visible foreign particles because such particles are unsightly, cause consumer complaints, and have an adverse effect on the sale and consumption of milk.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using facilities of a milk processing plant and/or comparable facilities in the school laboratory, clarify raw milk so that all visible foreign materials are completely removed.

B. INSTRUCTIONAL AREAS

1. Identifying basic operating features of various types of milk clarifying equipment
2. Identifying major parts of various types of milk clarifying equipment and their functions
3. Checking the milk temperature to determine if efficient clarifying can be performed
4. Determining when milk should be allowed to enter the clarifier
5. Checking the milk for complete removal of visible foreign particles
6. Operating the clarifier
7. Determining possible causes for improper clarifying
8. Making adjustments on the clarifying equipment

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. a. Have students verbaliy identify the major external and internal parts of the milk clarifier and their functions

b. Have students select appropriate tools and make adjustments on milk clarifiers.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. a. Have students write down possible causes of inefficient clarification. The teacher or supervisor should check papers and discuss with the students all possible causes of inefficient clarification.

b. Using a milk clarifier, the student should be able to clarify raw milk so that all foreign materials are removed.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Milk processing plant and/or comparable facilities in the school laboratory

2. Stored raw milk

3. Wrenches to adjust clarifiers

4. Rubber boots and hard hats

F. EXAMPLES OF SUPPORTING REFERENCES

1. Sommer, Hugo H. Market Milk and Related Products. Milwaukee, Wisconsin: Olsen Publishing Company. 1952, 750 pages.

This reference includes technical information needed for working in dairy processing plants. Tables, charts and pictures are included to assist students in understanding the material presented.

PASTEURIZING RAW MILK

UNIT CONCEPT: Raw milk is pasteurized to destroy all pathogenic organisms and to reduce the nonpathogenic bacteria which cause spoilage or loss of milk quality. Pasteurization helps provide milk that is safe to consume as well as extending its keeping quality.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using facilities of a milk processing plant and/or comparable facilities in the school laboratory, pasteurize raw milk so that pathogenic organisms are destroyed, nonpathogenic organisms are within state health codes, and the milk is not scorched.

B. INSTRUCTIONAL AREAS

1. Identifying reasons for pasteurizing milk

   a. Determining safety factors for consumption

      (1) Identifying pathogenic organisms which come from milk and possible effects on consumers
      (2) Identifying products where milk is used and its effects on those products

   . Determining reasons for keeping quality

      (1) Identifying the processes involved in moving the milk from the processing plant to consumers
      (2) Determining how milk products are used after purchase by consumers and the effect on keeping quality

   c. Identifying U.S. Department of Agriculture (USDA) and state standards for pasteurized milk

      (1) Determining temperatures and holding time for pasteurizing

(2) Determining bacterial limits per milliliter (ml.) for pasteurized milk
(3) Determining coliform limits per ml. for pasteurized milk
(4) Determining phosphatase limits per ml. for pasteurized milk

2. Identifying basic operating features of various types of milk pasteurizing equipment

a. Identifying types of milk pasteurizers

(1) Determining temperatures for pasteurizing
(2) Determining length of time for pasteurizing
(3) Determining advantages
(4) Determining disadvantages

b. Identifying the parts and their functions

3. Using correct procedures for pasteurizing

a. Checking conditions of control for proper operations (temperature, time for pasteurizing, etc.)

b. Directing milk into the pasteurizing equipment

c. Checking equipment for leaks

d. Preventing milk from being scorched

e. Preventing the milk from being adulterated with added water

f. Replacing thermometers

g. Reading and interpreting thermometers

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. a. Obtain two samples of milk, one a raw sample and the other a pasteurized sample. They should both be tested for bacteria count before performing this demonstration. The two samples should be left in a warm room for eight hours. After this time, they should be tested again for bacteria counts. Students should verbally explain the difference between the two.

b. Obtain charts and diagrams of milk pasteurizers from dairy processing equipment suppliers and have small groups of students study the parts and functions of them. After several group sessions, have students verbally identify parts and explain functions of parts of the machines.

c. Obtain used thermometer charts and have students interpret and verbally explain the charts to other students in the class.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Students should pasteurize milk with the use of a modern pasteurizer. After the milk has been pasteurized, a sample should be taken to the quality control laboratory for a phosphatase test to determine quality of pasteurization. The teacher should evaluate the phosphatase results to determine the student's ability to successfully pasteurize milk.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Milk processing plant and/or comparable facilities in the school laboratory
2. Raw milk
3. Hard hats, rubber boots
4. Sanitized containers for collecting pasteurized milk samples
5. Thermograph charts
6. Charts and diagrams of dairy pasteurizing equipment

F. EXAMPLES OF SUPPORTING REFERENCES

1. Henderson, James Lloyd. The Fluid-Milk Industry. Westport, Connecticut: The AVI Publishing Company, Inc. 1971, pp. 333-361.

This book includes sections on basic concepts for pasteurizing milk as well as the methods of pasteurization. Black and white pictures and diagrams are also included.

2. HTST Pasteurizer Operation Manual. Corvallis, Oregon: Education and Training Committee; Oregon Association of Milk, Food and Environmental Sanitarians, Inc.; O.S.U. Book Stores, Inc. 1968, 64 pages.

This reference includes the basic technical knowledge needed for operating the high temperature-short time (HTST) milk pasteurizer. Diagrams are included to assist in comprehending the technical information. HTST auxiliary equipment (homogenizer, clarifier, separator, etc.) and other related information is also included.

3. Manual for Milk Plant Operators. Washington, D.C.: Milk Industry Foundation. 1967, pp. 593-613.

The Manual for Milk Plant Operators is a very basic reference text. It covers the information needed for entering the dairy industry and is written on a level which could be used by high school vocational students.

4. Sommer, Hugo H. Market Milk and Related Products. Milwaukee, Wisconsin: Olsen Publishing Company. 1952, pp. 323-346.

This reference includes technical information needed for working in dairy processing plants. Tables, charts and pictures are included to assist one in acquiring the skill needed to work efficiently in the dairy processing industry.

HOMOGENIZING MILK

UNIT CONCEPT: Milk is homogenized to break-up and distribute fat globules. Homogenizing produces milk which is easier to digest, gives superior results in cooling, and is richer in color and flavor.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using facilities in a milk processing plant and/or comparable facilities in the school laboratory, homogenize milk so that fat globules are broken-up and evenly distributed.

B. INSTRUCTIONAL AREAS

1. Identifying reasons for homogenizing milk
   a. Improving the taste
   b. Improving the digestion
   c. Improving the appearance
   d. Meeting U.S. Public Health Service standards on distribution of butterfat after a specified period of time
2. Identifying operating features of milk homogenizers
   a. Determining how milk is forced into the homogenizer through the suction valve
   b. Determining how the milk is forced through the homogenizing valve where fat globules are broken-up and distributed throughout the milk
   c. Determining how milk is forced through the discharge valve and released
3. Procedures in operating homogenizers

a. Turning on the water to lubricate and cool pistons

b. Checking pressure controls to see that they are in idling position

c. Checking temperature of milk to be homogenized

d. Directing milk into the homogenizer

e. Checking to see that the product discharge from the machine is diverted until desired homogenizing pressures are obtained

f. Starting motor and homogenizing milk

g. Turning down the pressure-adjusting handle to adjust operation to desired pressure

h. Checking for leaks

i. Tightening plunger seals if necessary

j. Closing down machine

(1) Diverting the liquid flow before the machine pumps dry
(2) Releasing the pressure
(3) Stopping the motor
(4) Turning off the piston-lubricating water

4. Identifying problems in the operation of homogenizers

a. Observing equipment for leaks

b. Checking the equipment for violently fluctuating pressure

c. Listening for knocking sounds

d. Checking equipment for flow or intermittent forward flow of the liquid

5. General care and maintenance of the homogenizer

a. Lubrication program

(1) Using servicing records

(2) Using service manuals
(3) Servicing specified systems or parts

b. Removing and replacing seals

c. Removing and replacing homogenizing valves

d. Carefully handling pipes, fittings, pressure gauges, etc.

e. Checking equipment for proper seating of the suction and discharge valves

f. Drying homogenizer

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. a. The teacher should obtain two samples of pasteurized whole milk; one of the samples should be homogenized, the other unchanged. The students should observe and taste the two samples, verbally explaining the difference.

b. Have students explain the operating features of parts of various types of milk homogenizing equipment. While one student is explaining a part of the homogenizing equipment, the other students should evaluate his accuracy, asking questions when necessary.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Have students select appropriate tools and make adjustments on milk homogenizers. The teacher should evaluate each student on tool selection and the ability to adjust the homogenizer to produce milk in which fat globules are broken-up and evenly distributed.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Milk processing plant and/or comparable facilities in the school laboratory

2. Pasteurized whole milk

3. Hard hats, rubber boots

4. Charts and diagrams of dairy homogenizing equipment

F. EXAMPLES OF SUPPORTING REFERENCES

1. Henderson, James Lloyd. The Fluid-Milk Industry. Westport, Connecticut: The AVI Publishing Company, Inc. 1971, pp. 274-281.

   This section of Henderson's book includes the basic concepts needed for homogenizing milk.

2. Manual for Milk Plant Operators. Washington, D.C.: Milk Industry Foundation. 1967, pp. 342-356.

   The Manual for Milk Plant Operators is a very basic reference text. It covers the information needed for entering the dairy industry and is written on a level which could be used by high school vocational students.

3. Sommer, Hugo H. Market Milk and Related Products. Milwaukee, Wisconsin: Olsen Publishing Company. 1952, pp. 530-541.

   This reference includes technical information needed for working in dairy processing plants. Tables, charts and pictures are included to assist one in acquiring the skill needed to work efficiently in the dairy processing industry.

4. Trout, G. Malcolm. Homogenized Milk - A Review and Guide. East Lansing, Michigan: Michigan State College Press. 1950, 233 pages.

   This book includes information pertinent to the area of milk homogenization. The material could be easily understood by high school vocational students.

COOLING PROCESSED MILK

UNIT CONCEPT: Milk is properly cooled after pasteurization to prevent growth of bacteria and assist in maintaining keeping quality.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using facilities of a milk processing plant and/or comparable facilities in the school laboratory, cool processed milk well enough to prevent it from spoiling during typical storage and shipping times.

B. INSTRUCTIONAL AREAS

1. Determining effect of temperature on bacteria growth in milk which affects keeping quality
2. Identifying standards for cooling milk
   a. U.S. Department of Agriculture (USDA) standards
   b. State standards
   c. Local plant standards
3. Discussing types of milk coolers used for cooling milk
   a. Identifying operating features of surface coolers
      (1) Determining cooling medium used for cooling milk in surface coolers
      (2) Determining how the cooling medium enters and flows through the tubes to cool the milk
      (3) Determining how the milk flows while being cooled
   b. Identifying operating features of cabinet coolers
      (1) Determining cooling medium used in cabinet coolers

(2) Identifying the arrangement of small surface coolers and how the cooling medium flows
(3) Determining how the milk flows while being cooled
(4) Identifying advantages of cabinet coolers

(a) Compactness
(b) Appearance
(c) Floor space

c. Identifying operating features of plate-type coolers

(1) Determining types of cooling mediums used for cooling milk at various temperatures

(a) Propylene glycol
(b) Salt brine

(2) Determining arrangement of plates and how milk is cooled

(a) Flow of cooling medium
(b) Flow of milk

d. Identifying operating features of double-tube coolers

(1) Determining cooling medium used in double-tube coolers
(2) Arrangement of double tubes
(3) Determining how milk passes through tubes that serve as jackets through which cooling medium flows

4. Using correct procedures for cooling milk

a. Checking conditions of equipment before cooling

(1) Gaskets and pipe connections
(2) Checking the position of inlet and outlet valves to make sure milk flows in desired direction
(3) Availability of cooling medium

b. Directing milk into cooling equipment

c. Cooling milk

d. Preventing the milk from being adulterated with water and cooling medium

e. Examining milk for proper cooling

f. Making adjustments on cooling equipment

(1) Temperature
(2) Plates
(3) Fittings

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. a. Obtain samples of cooled milk and conduct temperature readings to determine if the milk was cooled according to USDA and state standards.

b. Obtain two samples of milk from a quart that has been cooled to 50° Fahrenheit (F.). One sample should be placed in an area where the temperature is maintained at 50° F. The other sample should be placed in a warm room. They should be left in their respective places for three days. After this period, bacteria counts should be taken and the students should compare each sample for types and amounts of bacteria growth.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. a. Have students cool milk with a modern milk cooler. The temperature of the milk cooled by the student should be less than 50° F.

b. Have the students position the outlet valve on a modern milk cooler so that the milk flows in the right direction after cooling.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Milk processing plant and/or comparable facilities in the school laboratory

2. Processed milk

3. Hard hats, rubber boots

4. Thermometers for determining milk temperatures after cooling

5. Charts and diagrams of dairy cooling equipment

F. EXAMPLES OF SUPPORTING REFERENCES

1. Henderson, James Lloyd. The Fluid-Milk Industry. Westport, Connecticut: The AVI Publishing Company, Inc. 1971, pp. 362-378.

   This section includes technical information required to satisfactorily cool milk. Tables and diagrams are included to assist in understanding the process.

2. Manual for Milk Plant Operators. Washington, D.C.: Milk Industry Foundation. 1967, pp. 593-613.

   The Manual for Milk Plant Operators is a very basic reference text. It covers the information needed for entering the dairy industry and is written on a level which could be used by high school vocational students.

3. Sommer, Hugo H. Market Milk and Related Products. Milwaukee, Wisconsin: Olsen Publishing Company. 1952, pp. 320-323.

   This reference includes technical information needed for working in dairy processing plants. Tables, charts and pictures are included to assist the student in acquiring skills needed to work efficiently in the dairy processing industry.

PACKAGING AND STORING PROCESSED MILK

UNIT CONCEPT: Processed milk is packaged in paper or plastic containers for ease of handling and to prevent contamination. The milk is cooled while in storage to maintain its quality.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using facilities of a milk processing plant and/or comparable facilities in the school laboratory, package milk so that the containers are properly filled, closed and/or sealed and are easy to handle.

2. When working in a plant casing and stacking area or comparable facilities in the school laboratory, case and stack milk without damaging the containers or hindering the casing and stacking operations.

3. Using facilities of a milk processing plant or comparable facilities in the school laboratory, store milk in a manner that meets existing health codes and plant standards for cooling and sanitation.

B. INSTRUCTIONAL AREAS

1. Packaging milk

   a. Identifying types of containers for packaging milk

      (1) The paper container

         (a) Determining type of material the container is made of to assist in keeping milk over a longer period of time

         (b) Determining reasons why paper containers are used in packaging milk

            1. Cost
            2. Consumer demand and marketing strategy

(2) The plastic container

(a) Determining type of material the container is made of to assist in keeping milk over a longer period of time

(b) Determining reasons why plastic containers are used in packaging milk

1. Cost
2. Consumer demand and marketing strategy

b. Identifying basic operating features of the "form and fill" (dairy-formed) milk packaging equipment

(1) How blanks should be placed in equipment
(2) How blanks enter the carton forming section of the packaging equipment so that cartons are formed properly
(3) How cartons are formed
(4) How formed cartons are released from the carton forming section of the packaging equipment
(5) How formed cartons are filled
(6) How cartons are sealed
(7) How filled cartons are released

c. Operating the "form and fill" (dairy-formed) milk packaging equipment

(1) Placing blanks on the forming section of the packaging equipment
(2) Forming cartons
(3) Checking cartons for proper forming
(4) Making adjustments on the forming section of the packaging equipment
(5) Removing cartons from equipment which have been torn during the forming process
(6) Directing milk into the packaging equipment
(7) Filling containers to proper level and/or weight
(8) Checking containers for proper level and/or weight
(9) Closing and sealing containers
(10) Checking containers for proper closing and sealing
(11) Removing damaged filled milk containers from packaging equipment

d. Identifying basic operating features of the "made-up" (factory-formed) milk packaging equipment

(1) Determining how milk is filled in containers

(a) The functions of cylinders
(b) The functions of pistons
(c) The functions of valves

(2) Determining how containers are closed
(3) Determining how containers are released

e. Operating the "made-up" (factory-formed) milk packaging equipment

(1) Placing formed containers on the equipment
(2) Directing milk into the packaging equipment
(3) Filling containers to proper level and/or weight
(4) Checking containers for proper level and/or weight
(5) Closing containers
(6) Checking containers for proper closing and sealing
(7) Removing damaged filled milk containers from packaging equipment

2. Operating equipment used for handling containers and cases

a. Operating milk casers

(1) Determining how containers are taken from the filling area and placed in cases
(2) Checking the equipment to make sure cases are available when needed
(3) Casing milk containers
(4) Checking equipment for proper placement and number of containers in cases

b. Operating milk case stackers

(1) Determining how the equipment stacks cases
(2) Stacking milk cases
(3) Checking the equipment to make sure cases are stacked properly
(4) Discharging stacked cases
(5) Preventing damage to containers and cases
(6) Preventing injuries to workers

c. Placing stacked milk containers on conveyors

(1) Preventing injuries to workers
(2) Preventing damage to milk containers

3. Storing milk

a. The types of cooling systems

(1) Identifying operating features of bare coils with brine circulation or with direct-expansion flooded ammonia

(a) Determining how air is cooled
(b) Determining how cold air is circulated

(2) Identifying operating features of unit coolers

(a) Determining how air is cooled
(b) Determining how cold air is circulated

b. Adjusting temperature in storage area according to U.S. Department of Agriculture (USDA) and state requirements

c. Manually removing milk from the conveyor

(1) Determining where products should be stored

(a) Considering when the product is scheduled to be shipped
(b) Locating appropriate available space

(2) Preparing area where products are to be stored

(a) Removing empty cases, half-filled cases, etc.
(b) Arranging and securing stacked products which have been stored
(c) Placing cases on stacks which are not stacked to desired height

(3) Placing products in desired storage area

(a) Preventing damage to products
(b) Preventing injuries to workers
(c) Checking products for proper placing

d. Using the fork truck to remove milk from the stacking area

(1) Determining where products are to be stored

(a) Considering when the product is scheduled to be shipped
(b) Locating appropriate available space

(2) Preparing are[illegible]cts are to be stored

(a) Remov[illegible]ases, half-filled cases, etc.
(b) Arrangin[illegible]curing stacked products which have been stored
(c) Placing cases on stacks which are not stacked to desired height

(3) Placing products in desired storage area

(a) Preventing damage to products
(b) Preventing injuries to workers
(c) Preventing damages to fork lift
(d) Checking products for proper placing

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. a. Obtain charts and diagrams of milk packaging equipment from a dairy plant equipment supplier. Divide students into groups of three and have them study the major parts to the milk packaging equipment. After several study and discussion sections, visit a milk processing plant ahd have students verbally identify major parts to milk packaging equipment.

b. Have students examine the closing and sealing of paper containers in a dairy processing plant. If containers are not properly sealed, students should verbally explain possible reasons for improper sealing.

2. Obtain five empty cases and have students properly stack them on top of each other. Then the students should incorrectly place five empty cases on top of each other. Students should describe the problems which could occur because of stacking cases improperly and the advantages of stacking them correctly.

3. a. Have students manually remove empty stacks of cases from conveyors and properly place in a given area.

b. Have students remove empty stacks of cases from the floor with a fork truck and properly place in a given area.

c. Have students read and record the temperature in a milk cooling room.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Have students place blanks on the carton forming section of the milk packaging equipment. The teacher or cooperating supervisor should evaluate the student based on the formation of cartons and the number of problems caused by improper placement of blanks.

2. a. Have students list three or more reasons why the case stacker will not properly stack milk cases and give possible solutions for eliminating problems.

b. Have students identify possible safety hazards in handling containers and cases in a dairy plant. After identifying possible hazardous conditions in the plant, the students should write down means for improving the working conditions in order that safety is maximized.

3. Have students manually remove several empty milk cases which have been stacked six high and properly arrange them in a given area. The student should be evaluated on his ability to remove stacked cases without any falls and the arrangement of the cases after completing the process.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Milk processing plant and/or comparable facilities in the school laboratory

2. Processed milk

3. Rubber boots, hard hats

4. Plastic milk containers, paper for making paper milk cartons

5. Milk cases

6. Fork lift truck

F. EXAMPLES OF SUPPORTING REFERENCES

1. Henderson, James Lloyd. The Fluid-Milk Industry. Westport, Connecticut: The AVI Publishing Company, Inc. 1971, pp. 263-268.

   This section of Henderson's book includes basic concepts needed for packaging and storing processed milk

2. Manual for Milk Plant Operators. Washington, D.C.: Milk Industry Foundation. 1967, pp. 467-486.

   The Manual for Milk Plant Operators is a very basic reference text. It covers the information needed for entering the dairy industry and is written on a level which could be used by high school vocational students.

CLEANING AND SANITIZING DAIRY EQUIPMENT

UNIT CONCEPT: Dairy processing equipment must be properly pre-rinsed, cleaned, post-rinsed, and sanitized so that when milk comes into contact with the surfaces it is not contaminated.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Using facilities in the school laboratory and/or dairy processing plant, manually clean and sanitize dairy parts (fittings, valves, etc.) so that the cleaning and sanitizing of parts meet the plant sanitation standards as well as local, state, and federal dairy plant sanitation standards.

2. Using facilities in the school laboratory and/or dairy processing plant, mechanically clean and sanitize the following types of dairy equipment so that plant sanitation standards are maintained:

   a. Raw milk storage tanks

   b. Clarifier

   c. Pasteurizer

   d. Homogenizer

   e. Cooler

   f. Filler

3. Disassemble and assemble the following dairy equipment so that the equipment can be manually cleaned and sanitized to meet plant, local, state and federal standards:

   a. Clarifier

   b. Pasteurizer

   c. Homogenizer

c. Cooler

e. Filler

B. INSTRUCTIONAL AREAS

1. Using sanitation procedures in manually cleaning and sanitizing dairy equipment parts

a. Selecting, measuring and mixing cleansers according to manufacturer's directions

(1) Using appropriate containers
(2) Using desired water temperature

b. Selecting, measuring and mixing sanitizers according to manufacturer's directions

(1) Using appropriate containers
(2) Using desired water temperature

c. Collecting and pre-rinsing dairy equipment parts

(1) Valves
(2) Fittings

d. Cleaning dairy equipment with the use of recommended brushes

e. Post-rinsing dairy equipment parts with desired water temperature

f. Sanitizing dairy equipment parts with the use of desired brushes

2. Using sanitation procedures in mechanically cleaning and sanitizing dairy equipment

a. Preparing cleansers and sanitizers

(1) Selecting, measuring and mixing cleansers according to manufacturer's directions with desired water temperatures
(2) Selecting, measuring and mixing sanitizers according to manufacturer's directions with desired water temperatures

b. Setting up the clean-in-place system in the plant so that dairy processing equipment can be cleaned and sanitized

(1) Making proper connections for setting up the clean-in-place system
(2) Checking levels of water solutions and temperatures for pre-rinsing, cleaning, post-rinsing and sanitizing

c. Operating the clean-in-place system

(1) Pre-rinsing dairy equipment
(2) Cleaning dairy equipment
(3) Post-rinsing dairy equipment
(4) Sanitizing dairy equipment

3. Disassembling and assembling dairy processing equipment for cleaning and sanitizing

a. The clarifier

(1) Identifying parts which are to be disassembled for cleaning
(2) Disassembling parts with desired tools

(a) Preventing damage to parts
(b) Placing parts in desired area on metal tables

(3) Pre-rinsing parts with desired water temperatures
(4) Cleaning parts with desired cleansers
(5) Post-rinsing parts
(6) Sanitizing parts with desired sanitizers

b. The pasteurizer

(1) Identifying parts which are to be disassembled for cleaning
(2) Disassembling parts with desired tools

(a) Preventing damage to parts
(b) Placing parts in desired area on metal tables

(3) Pre-rinsing parts with desired water temperatures
(4) Cleaning parts with desired cleansers
(5) Post-rinsing parts
(6) Sanitizing parts with desired sanitizers

c. The homogenizer

(1) Identifying parts which are to be disassembled for cleaning
(2) Disassembling parts with desired tools

(a) Preventing damage to parts
(b) Placing parts in desired area on metal tables

(3) Pre-rinsing parts with desired water temperature
(4) Cleaning parts with cleansers
(5) Post-rinsing parts
(6) Sanitizing parts with sanitizers

d. The cooler

(1) Identifying parts which are to be disassembled for cleaning
(2) Disassembling parts with desired tools

(a) Preventing damage to parts
(b) Placing parts in desired area on metal tables

(3) Pre-rinsing parts with desired water temperatures
(4) Cleaning parts with cleansers
(5) Post-rinsing parts
(6) Sanitizing parts with sanitizers

e. The filler

(1) Identifying parts which are to be disassembled for cleaning
(2) Disassembling parts with desired tools

(a) Preventing damage to parts
(b) Placing parts in desired area on metal tables

(3) Pre-rinsing parts with desired water temperature
(4) Cleaning parts with cleansers
(5) Post-rinsing parts
(6) Sanitizing parts with sanitizers

4. Using sanitation procedures for cleaning areas where milk products are processed

a. Preparing work areas for washing down

(1) Arranging equipment and removing obstacles
(2) Checking areas for proper drainage

b. Washing down work areas

(1) Using water hoses for rinsing and washing
(2) Using brooms for scrubbing

c. Storing equipment used for cleaning work areas

(1) Placing water hoses in desired area
(2) Storing brooms and pails

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. Obtain dairy processing equipment cleansers and have students measure and mix cleansers according to manufacturer's directions.

2. Have students practice connecting the clean-in-place system to the following dairy processing equipment:

a. Pipe line systems

b. Vats

c. Homogenizers

3. Divide the class into groups of three and have them disassemble and assemble specified parts to milk homogenizers.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Given parts (fittings, valves, etc.) to dairy processing equipment, the student must be able to clean and sanitize the parts so that the cleaning and sanitizing processes meet the approval of the teacher or cooperating supervisor.

2. Using the clean-in-place system, the student should be able to clean and sanitize milk fillers so that plant, local, state and federal standards are maintained.

3. Given a homogenizer to be cleaned and sanitized, the student should be able to disassemble and assemble the homogenizer so

that it can be cleaned and sanitized to maintain sanitation standards. The homogenizer should also work efficiently after it has been re-assembled.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. Dairy processing facilities in the school laboratory and/or commercial dairy processing plant
2. Cleansers and sanitizers, brooms, brushes, pails
3. Dairy processing equipment: clarifier; pasteurizer; homogenizer; cooler; filler
4. Clean-in-place system
5. Parts to dairy processing equipment: fittings, valves, etc.
6. Hard hats, rubber boots

F. EXAMPLES OF SUPPORTING REFERENCES

1. Guthrie, Rufus F. Food Sanitation. Westport, Connecticut: The AVI Publishing Company, Inc. 1972, pp. 130-160.

   Guthrie discusses in depth the theoretical concepts and practices of sanitation in dairy processing plants which should be understood by students who desire to work in this industry.

IV

FRUITS AND VEGETABLES

U.S.O.E. CODE 01.04 01 03 00

The Use of Food Products (Fruits, Vegetables, Nuts) Washing Equipment

The Use of Food Products (Fruits, Vegetables) Trimming Equipment

The Use of Food Products (Fruits, Vegetables) Peeling Equipment

The Use of Food Products (Fruits, Vegetables) Cutting Equipment

The Use of Food Products (Fruits, Vegetables) Blanching Equipment

The Use of Food Products (Fruits, Vegetables) Filling and Closing Equipment

The Use of Food Processing Cooking Equipment

THE USE OF FOOD PRODUCTS (FRUITS, VEGETABLES, NUTS) WASHING EQUIPMENT

UNIT CONCEPT: Machine washing fruits, vegetables, nuts and other food products before canning will help the products last longer after canning; it will also assist in providing safe, high quality products for human consumption. Regular adjustments, servicing, cleaning and sanitizing the washing equipment will: (1) provide greater equipment efficiency; (2) prolong equipment life; (3) assist in meeting plant, local, state and federal sanitation standards; and (d) increase operator safety.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Given commonly used washing equipment and specific types of food products (fruits, vegetables, nuts) to be washed, operate washing equipment to remove dirt and other undesirable materials from products and make necessary adjustments as conditions of the product change or when changing from one product to another, so that all undesirable particles are removed.

2. Given proper lubrication and repair tools and materials, lubricate and make minor repairs (hoses, gaskets) on commonly used food products washing equipment, according to the operator's manual.

3. Given commonly used cleaning and sanitizing solutions and equipment, clean and sanitize washing equipment according to desired plant sanitation requirements as well as local, state and federal standards.

B. INSTRUCTIONAL AREAS

1. Types and functions of washing equipment

   a. Identifying types of washing equipment for washing various types of food products

b. Identifying basic operating features of various types of washing equipment

c. Identifying major parts and their functions

2. Adjusting and operating washing equipment

a. Identifying parts requiring adjustments

b. Selecting tools and equipment for adjustment

c. Keeping adjustments records

d. Determining and setting amount and temperature of water

e. Determining and setting amount of prescribed cleaning agents

f. Determining and setting amount of products to be cleaned at a given time

g. Setting length of time for cleaning products

h. Preventing damage to product

i. Preventing injuries to workers

j. Preventing damage to equipment

k. Using the controls for washing food products

3. Lubricating and making minor repairs on washing equipment

a. Identifying grease and oils, and their characteristics

b. Identifying parts requiring grease and oils

c. Using correct greasing procedures according to operator's manual

d. Determining a lubrication schedule according to the operation and manufacturer's specifications

(1) Using servicing records
(2) Using service manuals

e. Servicing specified systems and/or parts according to manufacturer's specifications

(1) Checking and replacing seals
(2) Checking and tightening or replacing hoses and pipe fittings

f. Checking all visible parts for malfunctions

g. Selecting appropriate tools and making minor repairs

4. Cleaning and sanitizing equipment

a. Determining cleaning and sanitizing procedures required for various types of equipment

(1) Using the hand method
(2) Using the automatic clean-in-place method

b. Selecting water temperature for pre-rinsing, washing, post-rinsing and sanitizing

c. Selecting, measuring and mixing cleansers

d. Selecting, measuring and mixing sanitizers

e. Determining and setting length of time for cleaning and sanitizing equipment with the use of the clean-in-place system

f. Operating controls for cleaning and sanitizing

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. a. Take field trips to various types of food processing plants (fruits, vegetables, nuts) and have plant managers or supervisors explain and demonstrate the operation of various types of washing equipment.

b. Have students practice setting time for washing a given product in the school cannery or a canning industry.

2. Have students lubricate specified parts to the washing equipment with manual and mechanical lubricating equipment.

3. Have students measure and mix cleansers according to manufacturer's directions.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Given a type of washing equipment and a specific type of food product, the student must be able to wash the product so that it meets the approval of the teacher or cooperating supervisor.

2. Given equipment used to lubricate washing equipment, the student must be able to lubricate the washing equipment according to the manufacturer's specifications.

3. Using cleansers and sanitizers, the student must be able to manually clean and sanitize parts to the washing equipment so that it meets the approval of the teacher or cooperating supervisor.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. School cannery, with washing equipment

2. Fruits, vegetables and nuts processing plants, with washing equipment

3. Food processing plant adjustment tools

4. Visual check sheets

5. Service charts

6. Lubricating equipment

7. Product cleaning solutions

8. Cleansers and sanitizers, brooms, brushes, pails

9. Hard hats and rubber boots

F. EXAMPLES OF SUPPORTING REFERENCES

1. The Canning Industry. Washington, D.C.: Communication Services, National Canners Association. 1971, 56 pages.

In this reference, the National Canners Association provides a general overview in terms of the history, importance, organization, methods, and the public service values of the products which come from the canning industry.

2. Joslyn, Maynard A. and Heid, J. L. Food Processing Operations - Their Management, Machines, Materials, and Methods. Westport, Connecticut: The AVI Publishing Company, Inc. 1963, pp. 505-522.

This section of the book includes the processes involved in receiving and preparing fruits and vegetables for processing.

THE USE OF FOOD PRODUCTS (FRUITS, VEGETABLES) TRIMMING EQUIPMENT

UNIT CONCEPT: Fruits and vegetables are trimmed by machines for the purpose of topping, tailing, and cutting the product for the desired style of pack. Regular adjustments, servicing, cleaning and sanitizing the trimming equipment will: (1) provide greater equipment efficiency; (2) prolong the life of the equipment; (3) assist in meeting plant, local, state and federal sanitation standards; (4) increase operator safety; and (5) reduce costs for repairing equipment.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Given commonly used trimming equipment and specific types of food products to be trimmed, operate and adjust trimming equipment to remove toppings, tailings, and to cut products for the desired style of pack.

2. Given proper lubrication materials and commonly used lubricating tools and materials, lubricate and make minor repairs (check and replace cutting blades) on commonly used trimming equipment according to the operator's manual.

3. Given commonly used cleansers and sanitizers, clean and sanitize trimming equipment according to desired plant sanitation requirements as well as local, state and federal standards.

B. INSTRUCTIONAL AREAS

1. Types and functions of trimming equipment

   a. Identifying types of trimming equipment for various types food products

   b. Identifying basic operating features of various types of trimming equipment

c. Identifying major parts and their functions

2. Adjusting and operating trimming equipment

a. Identifying parts requiring adjustments

b. Determining when adjustments are needed

c. Selecting tools and equipment for adjustments

d. Determining products to be trimmed

e. Determining number and/or weight of products to be trimmed at a given time

f. Checking and adjusting for desired trimmings

(1) Using the controls
(2) Determining and setting replaceable parts for trimming different sizes of products

g. Keeping adjustment records

h. Preventing injuries to workers

i. Preventing damage to product

j. Preventing damage to equipment

3. Lubricating and making minor repairs on trimming equipment

a. Selecting grease and oils

b. Identifying parts requiring grease and oils

c. Using correct greasing procedures according to the operator's manual

d. Determining a lubrication schedule according to the operation

(1) Using servicing records
(2) Using service manuals

e. Servicing specified systems and/or parts according to manufacturer's specifications

(1) Checking condition of cutting blades
(2) Removing and replacing cutting blades
(3) Checking all visible parts for malfunctions or wear

f. Making minor repairs with appropriate tools

4. Cleaning and sanitizing equipment

a. Determining cleaning and sanitizing procedures required for various types of equipment

(1) Using the hand method
(2) Using the automatic clean-in-place method

b. Selecting water temperatures for washing, rinsing and sanitizing

c. Selecting, measuring and mixing cleaning solutions

d. Selecting, measuring and mixing sanitizing solutions

e. Determining and setting length of time for cleaning and sanitizing equipment

f. Operating controls

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. a. Take field trips to various types of fruit and vegetable processing plants and have plant managers or supervisors explain and demonstrate the operation of different types of trimming equipment.

b. Practice adjusting trimming equipment for desired trimmings on given products.

c. Practice setting replaceable parts for trimming various sized products according to plant specifications.

d. Practice checking adjustments by observing trimmed products to determine if the operation is meeting plant specifications.

e. Practice removing and replacing cutting blades with appropriate tools.

f. Practice operating trimming equipment by trimming different types and sizes of fruits and vegetables with and without assistance from plant employees.

2. Practice greasing and oiling trimming equipment with appropriate lubricants and lubricating equipment.

3. Practice measuring and mixing appropriate cleansers and sanitizers for cleaning and sanitizing trimming equipment.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Given commonly used trimming equipment and a specific type of food product to be trimmed, the student must be able to operate trimming equipment to remove toppings, tailings and cut products for desired style of pack so that the product meets the approval of the teacher or cooperating supervisor.

2. Given proper lubrication materials and commonly used lubricating tools and equipment, the student must be able to lubricate commonly used food products trimming equipment according to the operator's manual.

3. Given commonly used cleansers and sanitizers, the student must be able to clean and sanitize trimming equipment so that it meets the approval of the teacher or supervisor.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. School cannery with trimming equipment

2. Fruit and vegetable processing plant training stations

3. Various types and sizes of fruits and vegetables

4. Visual check sheets

5. Service charts

6. Lubricating equipment

7. Cleansers and sanitizers, clean-in-place system, brooms, brushes, pails

8. Hard hats and rubber boots

F. EXAMPLES OF SUPPORTING REFERENCES

1. The Canning Industry. Washington, D.C.: Communication Services, National Canners Association. 1971, 56 pages.

   In this reference, the National Canners Association provides a general overview in terms of the history, importance, organization, methods, and the public service values of the products which come from the canning industry.

2. Joslyn, Maynard A. and Heid, J. L. Food Processing Operations - Their Management, Machines, Materials, and Methods. Westport, Connecticut: The AVI Puslishing Company, Inc. 1963, 644 pages.

   All aspects of processing fruits and vegetables are discussed in this reference.

THE USE OF FOOD PRODUCTS (FRUITS, VEGETABLES) PEELING EQUIPMENT

UNIT CONCEPT: Many fruits and vegetables are peeled for processing. This serves multiple purposes of removing residual soil, pesticide residues, and coarse, fuzzy or tough peeling with unpleasant appearance, texture, or digestive properties. Regular adjustments, servicing, cleaning and sanitizing the peeling equipment will: (1) provide a high quality product; (2) provide greater equipment efficiency; (3) promote longer life of the equipment; (4) reduce cost for repairing equipment; (5) assist in meeting plant, local, state and federal sanitation standards; and (6) increase operator safety.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Given commonly used peeling equipment and specific types of products to be peeled, operate and adjust the peeling equipment to remove all of the product peelings cleanly and evenly with a minimum of waste of edible product, and make adjustments when changing from one product to another.

2. Given proper lubrication materials and commonly used lubricating tools and equipment, lubricate and make minor repairs (check and replace belts, rollers) on commonly used peeling equipment according to the operator's manuals.

3. Given commonly used cleansers and sanitizers, clean and sanitize peeling equipment according to desired plant sanitation requirements as well as local, state and federal standards.

B. INSTRUCTIONAL AREAS

1. Types and functions of peeling equipment

   a. Identifying methods of peeling various types of fruits and vegetables

b. Identifying types of peeling equipment for peeling various types of fruits and vegetables

c. Identifying basic operating features of various types of peeling equipment

d. Identifying major parts of peeling equipment and their functions

2. Adjusting and operating peeling equipment

a. Identifying parts requiring adjustments

b. Determining when adjustments are needed

c. Selecting tools and equipment for making adjustments

d. Determining the type of products to be peeled and the method for peeling

e. Determining the volume and/or weight of products to be peeled at a given time

f. Adjusting and checking equipment for the desired peeling

(1) Selecting temperatures (water, steam, flame, or radiant heat)
(2) Selecting length of time for peeling

g. Keeping peeling adjustment records

h. Mixing caustic solutions

i. Preventing injuries to the workers

j. Preventing damage to the product

k. Preventing damage to the equipment

l. Using the controls

3. Lubricating and making minor repairs on peeling equipment

a. Selecting grease and oils according to operator's manual

b. Identifying parts requiring grease and oil

c. Using correct greasing procedures according to operator's manual

d. Determining a lubrication schedule according to the operation

(1) Using servicing manuals
(2) Using servicing records

e. Servicing specified systems and/or parts according to the manufacturer's specifications

f. Checking all visible parts for malfunctions

g. Making minor repairs (belt, rollers)

4. Cleaning and sanitizing equipment

a. Determining cleaning and sanitizing procedures required for various types of equipment

(1) Using the hand method of cleaning
(2) Using the automatic clean-in-place method

b. Selecting water temperatures for washing, rinsing, and sanitizing equipment

c. Selecting, measuring and mixing cleansers

d. Selecting, measuring and mixing sanitizers

e. Determining and setting length of time for cleaning and sanitizing equipment

f. Operating controls

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. a. Take a field trip to a fruit and vegetable processing plant and have students identify major parts of various types of peeling equipment.

b. Take field trips to fruit and vegetable processing plants and have plant managers or supervisors explain and demonstrate the operation of various types of peeling equipment.

c. Practice adjusting peeling equipment for desired peelings with recommended tools.

d. Practice peeling various types of fruits and vegetables with appropriate equipment.

e. Practice mixing caustic solutions for peeling fruits and vegetables according to plant specifications.

2. Practice identifying, greasing and oiling required parts to peeling equipment according to manufacturer's specifications.

3. Practice cleaning and sanitizing the equipment with recommended brushes and chemicals.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Given commonly used peeling equipment and a specific type of product to be peeled, the student should be able to operate the equipment to remove the product's peelings, according to plant standards.

2. Given proper lubrication materials and commonly used lubricating tools and materials, the student must be able to lubricate peeling equipment according to operator's manuals.

3. Given commonly used cleansers and sanitizers, the student must be able to clean and sanitize peeling equipment according to desired plant sanitation requirements.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. School cannery with peeling equipment

2. Fruit and vegetable canning plant training stations

3. Various types of raw fruits and vegetables suitable for peeling

4. Cleaning and sanitizing chemicals

5. Visual inspection check sheets

6. Service charts

7. Lubricating equipment

8. Hard hats and rubber boots

F. EXAMPLES OF SUPPORTING REFERENCES

1. The Canning Industry. Washington, D.C.: Communication Services, National Canners Association. 1971, 56 pages.

   In this reference, the National Canners Association provides a general overview in terms of the history, importance, organization, methods, and the public service values of the products which come from the canning industry.

2. Joslyn, Maynard A. and Heid, J. L. Food Processing Operations - Their Management, Machines, Materials, and Methods. Westport, Connecticut: The AVI Publishing Company, Inc. 1963, 644 pages.

   All aspects of processing fruits and vegetables are discussed in this reference.

THE USE OF FOOD PRODUCTS (FRUITS, VEGETABLES) CUTTING EQUIPMENT

UNIT CONCEPT: Many vegetables and fruits require cutting - shredding, slicing, or dicing - prior to final processing for ease in handling and packaging and to facilitate other processes such as dehydration, freezing, canning, or jam making. Regular adjustments, servicing, cleaning and sanitizing of the cutting equipment will: (1) produce desirable product form for consumer; (2) provide greater equipment efficiency; (3) prolong equipment life; (4) reduce cost for equipment repairs; (5) assist in meeting plant, local, state and federal sanitation standards; and (6) increase operator safety.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Given commonly used cutting equipment and specific types of fruits and vegetables to be cut, operate cutting equipment to cut products according to plant specifications (shape, size, length) and make adjustments as plant specifications change or when changing from one product to another.

2. Given proper lubrication materials and commonly used lubricating and repair tools and equipment, lubricate and make minor repairs (checking and replacing cutting knives) on commonly used cutting equipment according to operator's manuals.

3. Given commonly used cleansers and sanitizers, clean and sanitize cutting equipment according to desired plant sanitation requirements as well as sanitation requirements set by local, state and federal food plant inspection agencies.

B. INSTRUCTIONAL AREAS

1. Types and functions of cutting equipment

   a. Identifying types of cutting equipment for cutting various types of fruits and vegetables

b. Identifying basic operating features of various types of cutting equipment

c. Identifying major parts and their functions

2. Adjusting and operating cutting equipment

a. Identifying parts requiring adjustments

b. Determining when adjustments are needed

c. Selecting tools and equipment for adjustments

d. Determining products to be cut

e. Determining number and/or weight of products to be cut at a given time

f. Adjusting and checking equipment for desired cuts

(1) Using the controls
(2) Determining and setting equipment for desired size, length, and shape
(3) Determining and setting equipment for cutting different type products

g. Keeping cutting adjustments records

h. Preventing injuries to the workers

i. Preventing damage to the product

j. Preventing damage to equipment

k. Using the controls

3. Lubricating and making minor repairs on cutting equipment

a. Selecting grease and oils

b. Identifying parts requiring grease and oils

c. Using correct greasing procedures according to operator's manual

d. Determining a lubrication schedule according to the operation

(1) Using servicing manuals
(2) Using servicing records

e. Servicing specified systems and/or parts according to manufacturer's specifications

f. Checking all visible parts for malfunctions

g. Making minor repairs (checking and replacing stainless steel knives)

h. Sharpening blades

4. Cleaning and sanitizing equipment

a. Determining cleaning and sanitizing procedures required for various types of equipment

(1) Using the hand method of cleaning
(2) Using the automatic clean-in-place method

b. Selecting water temperatures for washing, rinsing and sanitizing equipment

c. Selecting, measuring and mixing cleaning solutions

d. Selecting, measuring and mixing sanitizing solutions

e. Determining and setting length of time for cleaning and sanitizing equipment

f. Operating controls

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. a. Take field trips to visit different types of fruit and vegetable processing plants and have the plant managers or supervisors explain and demonstrate the operation of various types of cutting equipment.

b. Have students identify major parts to different types of cutting equipment, using references, and explain the function of each part.

c. Practice adjusting cutting equipment with appropriate tools for the desired cutting.

d. Practice cutting various types of fruits and vegetables with cutting equipment.

2. Practice greasing and oiling required parts to cutting equipment according to manufacturer's specifications.

3. Practice cleaning and sanitizing cutting equipment with recommended brushes, cleansers and sanitizers.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Given commonly used cutting equipment and a specific type of fruit or vegetable to be cut, the student must be able to operate cutting equipment to cut products according to plant specifications (shape, size, length).

2. Given proper lubrication materials and commonly used lubricating tools and equipment, the student should be able to lubricate and make minor repairs on commonly used cutting equipment according to operator's manuals.

3. Given commonly used cleansers and sanitizers, the student should be able to clean and sanitize cutting equipment so that it meets the approval of the teacher or supervisor.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. School cannery with cutting equipment

2. Fruits and vegetables canning plant training stations

3. Various raw fruits and vegetables

4. Lubricating equipment, hand tools for repairs or adjustments

5. Visual inspection check sheets and service charts

6. Cleansers, sanitizers, brooms, brushes, pails

7. Hard hats and rubber boots

F. EXAMPLES OF SUPPORTING REFERENCES

1. The Canning Industry. Washington, D.C.: Communication Services, National Canners Association. 1971, 56 pages.

   In this reference, the National Canners Association provides a general overview in terms of the history, importance, organization, methods, and the public service values of the products which come from the canning industry.

2. Joslyn, Maynard A. and Heid, J. L. Food Processing Operations - Their Management, Machines, Materials, and Methods. Westport, Connecticut: The AVI Publishing Company, Inc. 1963, 644 pages.

   All aspects of processing fruits and vegetables are discussed in this reference.

THE USE OF FOOD PRODUCTS (FRUITS, VEGETABLES)

BLANCHING EQUIPMENT

UNIT CONCEPT: Blanching of certain food products prior to canning, drying, or freezing is an important process to the food industry. It cleans the product, destroys enzymes, improves the texture, and reduces vitamin losses, as well as expelling gases and wilting certain products to aid in filling containers.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Given commonly used blanching equipment and specific types of fruits and/or vegetables to be blanched, operate blanching equipment according to plant specifications (length of time for blanching, water temperature), making adjustments when changing from one product to another.

2. Given proper lubrication materials and commonly used lubricating tools and equipment, lubricate and make minor repairs (hoses, gaskets) on commonly used blanching equipment according to operator's manual.

3. Given commonly used cleansers and sanitizers, clean and sanitize blanching equipment according to desired plant sanitation requirements as well as local, state and federal standards.

B. INSTRUCTIONAL AREAS

1. Types and functions of blanching equipment

   a. Identifying types of blanching equipment for various fruits and vegetables

   b. Identifying basic operating features of various types of blanching equipment

   c. Identifying major parts and their functions

2. Adjusting and operating blanching equipment

   a. Identifying parts requiring adjustments

   b. Determining when adjustments are needed and checking adjustments

   c. Selecting tools and equipment for adjustments

   d. Keeping adjustment records

   e. Determining and setting amount and temperature of water for blanching

   f. Determining and setting number of products to be blanched at a given time

   g. Determining and setting length of time for blanching

   h. Preventing damage to product

   i. Preventing injuries to workers

   j. Preventing damage to equipment

   k. Using the controls for blanching

3. Lubricating and making minor repairs on blanching equipment

   a. Selecting grease and oils

   b. Identifying parts requiring grease and oils

   c. Using correct greasing procedures according to operator's manual

   d. Determining a lubrication schedule according to the operation

      (1) Using servicing records
      (2) Using servicing manuals

   e. Servicing specified systems and/or parts according to manufacturer's specifications

(1) Checking and replacing seals
(2) Checking, tightening or replacing hoses and pipe fittings

f. Checking all visible parts for malfunctions

g. Making minor repairs with appropriate tools

4. Cleaning and sanitizing equipment

a. Determining cleaning and sanitizing procedures required for various types of equipment

(1) Using the hand method
(2) Using the automatic clean-in-place method

b. Selecting water temperatures for washing, rinsing, and sanitizing equipment

c. Selecting, measuring and mixing cleansers

d. Selecting, measuring and mixing sanitizers

e. Determining and setting length of time for cleaning and sanitizing equipment

f. Operating controls

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. a. Using facilities of a fruit and vegetable processing plant or comparable school facilities, practice setting amount and tempeature of water for blanching fruits and vegetables.

b. Practice setting length of time for blanching.

c. Practice blanching different types of fruits and vegetables.

2. Practice lubricating all specified systems and/or parts to blanching equipment with recommended equipment and materials.

3. Practice measuring and mixing cleansers and sanitizers used for cleaning and sanitizing blanching equipment.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Given commonly used blanching equipment and a specific type of fruit or vegetable to be blanched, the student should be able to operate equipment to blanch products according to plant specifications (length of time for blanching, water temperature).

2. Given proper lubrication materials and commonly used lubricating tools and equipment, the student must be able to lubricate and make minor repairs on commonly used fruit and vegetable blanching equipment according to operator's manual.

3. Given commonly used cleansers and sanitizers, the student should be able to clean and sanitize blanching equipment according to plant, local, state and federal sanitation standards.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. School cannery with blanching equipment

2. Fruits and vegetables processing plants with blanching equipment

3. Various types of raw fruits and vegetables suitable for blanching

4. Visual inspection check sheets and service charts

5. Tools for repair, lubrication and adjustment of blanching equipment

6. Various cleaning and sanitizing chemicals, scrub brushes and buckets

7. Hard hats and rubber boots

F. EXAMPLES OF SUPPORTING REFERENCES

1. The Canning Industry. Washington, D.C.: Communication Services, National Canners Association. 1971, 56 pages.

   In this reference, the National Canners Association provides a general overview in terms of the history, importance, organization, methods, and the public service values of the products which come from the canning industry.

2. Joslyn, Maynard A. and Heid, J. L. Food Processing Operations - Their Management, Machines, Materials, and Methods. Westport, Connecticut: The AVI Publishing Company, Inc. 1963, 644 pages.

All aspects of processing fruits and vegetables are discussed in this reference.

THE USE OF FOOD PRODUCTS (FRUITS, VEGETABLES) FILLING AND CLOSING EQUIPMENT

UNIT CONCEPT: Fruits and vegetables which are to be canned are usually packed in tin or glass containers. Regular adjustments, servicing, cleaning and sanitizing of filling and closing equipment will: (1) assist in providing a safe, high quality, longer lasting consumer product; (2) provide greater equipment efficiency; (3) promote longer equipment life; (4) assist in meeting plant, local, state and federal sanitation standards; and (5) increase operator safety.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Given commonly used filling equipment and specific types of fruits and vegetables, operate filling equipment and make adjustments as the product conditions change (size, length) or when changing from one product or type of container to another so that the containers are filled according to plant specifications.

2. Given commonly used closing equipment and specific types of food products and containers, operate closing equipment and make necessary adjustments when changing from one size or type of container to another so that the containers are properly sealed.

3. Given proper lubrication materials and commonly used lubricating tools and equipment, lubricate filling and closing equipment according to the operator's manual.

4. Given commonly used cleaning and sanitizing solutions and equipment, clean and sanitize filling and closing equipment according to desired plant sanitation requirements as well as local, state and federal standards.

B. INSTRUCTIONAL AREAS

1. Types and functions of filling equipment

a. Identifying types of filling equipment for filling different fruits and vegetables in various types of containers

b. Identifying basic operating features of various types of filling equipment

c. Identifying major parts and their functions

2. Adjusting and operating filling equipment

a. Identifying parts requiring adjustments

b. Determining when adjustments are needed and checking adjustments

c. Selecting tools and equipment

d. Keeping adjustment records

e. Determining and setting volume and weight of products to fill types of containers

f. Adjusting and checking equipment for desired fill

g. Using the controls

3. Types and functions of closing equipment

a. Identifying types of closing equipment used for closing and sealing different types of containers

b. Identifying basic operating features of various types of closing and sealing equipment

c. Identifying major parts and their functions

4. Adjusting and operating closing equipment

a. Identifying parts requiring adjustments

b. Determining when adjustments are needed and checking adjustments

(1) Using the controls
(2) Determining containers to be closed

c. Keeping adjustment records

d. Using the controls

5. Lubricating and making minor repairs on filling and closing equipment

a. Selecting grease and oils

b. Identifying parts requiring grease and oils

c. Using correct greasing procedures according to operator's manual

d. Determining a lubrication schedule according to the operation

(1) Using servicing records
(2) Using service manuals

e. Servicing specified systems and/or parts according to manufacturers' specifications

f. Checking all visible parts for malfunctions or wear

g. Making minor repairs with appropriate tools

6. Cleaning and sanitizing filling and closing equipment

a. Determining cleaning and sanitizing procedures required for various types of equipment

(1) Using the hand method
(2) Using the automatic clean-in-place method

b. Selecting water temperatures for washing, rinsing, and sanitizing filling and closing equipment

c. Selecting, measuring and mixing detergent solutions

d. Selecting, measuring and mixing sanitizing solutions

e. Determining and setting length of time for cleaning and sanitizing equipment

f. Operating the clean-in-place system

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. a. Take field trips to different types of fruit and vegetable processing plants and have plant managers and supervisors explain and demonstrate the operation of various types of filling and closing equipment.

   b. Practice identifying parts to filling equipment that require regular adjustments.

   c. Practice operating filling equipment.

2. a. Practice operating closing equipment.

   b. Practice adjusting closing equipment according to plant specifications.

3. Practice greasing and oiling filling and closing equipment with appropriate lubricants and lubricating equipment.

4. Practice selecting, measuring, and mixing appropriate cleansers and sanitizers for cleaning and sanitizing filling and closing equipment.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Given commonly used filling equipment and specific types of fruits and vegetables, the student should be able to operate filling equipment so that containers are filled according to plant specifications.

2. Given commonly used closing equipment and specific types of containers, the student should be able to operate closing equipment so that containers are closed according to plant specifications.

3. Given proper lubrication materials and commonly used lubricating tools and equipment, the student should be able to lubricate filling and closing equipment according to the operator's manual.

4. Given commonly used cleaning and sanitizing solutions and equipment, the student should be able to clean and sanitize filling and closing equipment according to desired plant sanitation standards as well as local, state and federal requirements.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. School cannery with filling and closing equipment
2. Fruit and vegetable canning processing plant training stations
3. Various types and sizes of processed fruits and vegetables
4. Tin and glass canning containers
5. Visual check sheets and service charts
6. Scrub brushes and buckets, cleansers and sanitizers
7. Hard hats and rubber boots

F. EXAMPLES OF SUPPORTING REFERENCES

1. The Canning Industry. Washington, D.C.: Communication Services, National Canners Association. 1971, 56 pages.

   In this reference, the National Canners Association provides a general overview in terms of the history, importance, organization, methods, and the public service values of the products which come from the canning industry.

2. Joslyn, Maynard A. and Heid, J. L. Food Processing Operations - Their Management, Machines, Materials, and Methods. Westport, Connecticut: The AVI Publishing Company, Inc. 1963, 644 pages.

   All aspects of processing fruits and vegetables are discussed in this reference.

THE USE OF FOOD PROCESSING COOKING EQUIPMENT

UNIT CONCEPT: During the food products cooking process, microorganisms, which could cause spoilage if their action were not stopped, are destroyed by heat. Regular adjustments, servicing, cleaning and sanitizing the cooking equipment will: (1) assist in providing a safe, high quality product for human consumption; (2) provide greater equipment efficiency; (3) promote longer equipment life; (4) assist in meeting plant, local, state and federal sanitation standards; and (5) increase operator safety.

A. STUDENT PERFORMANCE OBJECTIVES

The student should be able to:

1. Given commonly used cooking equipment and specific types of food products to be cooked, operate cooking equipment according to plant specifications (cooking time, water temperature) and make necessary adjustments as changes occur in the product or containers.

2. Given proper lubrication materials and commonly used lubricating tools and equipment, lubricate and make minor repairs (checking and replacing valves and gaskets) on cooking equipment according to the operator's manual.

3. Given commonly used cleansers and sanitizers, clean and sanitize cooking equipment according to desired plant sanitation requirements as well as local, state and federal standards.

B. INSTRUCTIONAL AREAS

1. Types and functions of cooking equipment

   a. Identifying types of cooking equipment

   b. Identifying basic operating features of various types of cooking equipment

c. Identifying major parts and their functions

2. Adjusting and operating cooking equipment

a. Identifying parts requiring adjustments

b. Determining when adjustments are needed and checking adjustments

c. Selecting tools and equipment

d. Keeping adjustment records

e. Determining products to be cooked and type of filled containers

f. Determining volume and/or weight of products to be cooked at a given time

g. Adjusting and checking equipment for desired cooking

(1) Using the controls
(2) Determining and setting temperature and length of time for processing

h. Cooling the product after cooking

3. Lubricating and making minor repairs on cooking equipment

a. Selecting grease and oils

b. Identifying parts requiring grease and oils

c. Using correct greasing procedures according to operator's manual

d. Determining a lubrication schedule according to the operation

(1) Using servicing records
(2) Using service manuals

e. Servicing specified systems and/or parts according to manufacturers' specifications

f. Checking all visible parts for malfunctions or wear

g. Making minor repairs

(1) Selecting appropriate tools
(2) Replacing hoses

4. Cleaning and sanitizing equipment

a. Determining cleaning and sanitizing procedures required for various types of equipment

(1) Using the hand method
(2) Using the automatic clean-in-place method

b. Selecting water temperatures for washing, rinsing and sanitizing

c. Selecting, measuring and mixing cleaning solutions

d. Selecting, measuring and mixing sanitizing solutions

e. Determining and setting length of time for cleaning and sanitizing equipment

f. Operating controls

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. a. Using the facilities of a fruit and vegetable processing plant or comparable school facilities, practice setting water temperature for cooking fruits and vegetables.

b. Practice setting length of time for cooking.

c. Practice cooking various types of fruits and vegetables.

2. Practice lubricating all specified systems and/or parts to cooking equipment with recommended equipment and materials.

3. Have students use appropriate brushes and clean parts to the cooking equipment.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. Given commonly used cooking equipment and specific types of food products to be cooked, the student should be able to operate cooking equipment and cook products according to plant specifications.

2. Given proper lubrication materials and commonly used lubricating tools and equipment, the student must be able to lubricate equipment according to the operator's manual.

3. Given commonly used cleaning and sanitizing solutions and equipment, the student should be able to clean and sanitize cooking equip-equipment according to plant, local, state and federal sanitation standards.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. School cannery with cooking equipment
2. Canning food processing plant training stations
3. Various types of canned food products
4. Visual check sheets and service charts
5. Lubricating equipment
6. Equipment washing and sanitizing solutions, scrub brushes, buckets
7. Hard hats and rubber boots

F. EXAMPLES OF SUPPORTING REFERENCES

1. The Canning Industry. Washington, D.C.: Communication Services, National Canners Association. 1971, 56 pages.

   In this reference, the National Canners Association provides a general overview in terms of the history, importance, organization, methods, and the public service values of the products which come from the canning industry.

2. Joslyn, Maynard A. and Heid, J. L. Food Processing Operations - Their Management, Machines, Materials, and Methods. Westport, Connecticut: The AVI Publishing Company, Inc. 1963, 644 pages.

   All aspects of processing fruits and vegetables are discussed in this reference.

APPENDIX A

RECOMMENDED MATERIALS OR EQUIPMENT

This list of equipment can be used as a guide in ordering and assembling those items needed.

General Agricultural Products (Food Processing) Equipment

Hard hats
Rubber boots
Food processing equipment cleansers
Food processing equipment sanitizers
Hand brushes
Floor brooms
Sanitizing equipment
Water hoses
Fails
Aprons
Work uniforms
First aid kits
Manual chemical applicator

Livestock Meat Processing Equipment

Bleeding knives
Hot water thermometer
Electrical grinder
Knife rocks and pouches
Electrical prod
Butcher knives
Block brushes
Block scraper
Meat block
Electric meat cutting hand saw
Metal cutting tables
Tying machine
Wrapping materials:
    Wrapping wax
    Butcher wrap

Livestock Meat Processing Equipment (Continued)

- Freezer wrap
- Patty paper
- Twine
- Gummed tape

Shrouding cloth
Knocking pen
Hoist system
Hog scalding tub
Dehairer
Rail dropper
Elevating platform
Electric stunner, complete
Humane stunning pistol, complete
Head flushing cabinet
Head work-up table
Pluck trimming table
Hock cutter sterilizer
Paunch truck
Sticker platform
Sterilizing lavatory
Tracking system and switches
Brake rail
Landing table
Beef shackle system
Hog shackle system
Beef roller system
Hog gamble system
Roller poles and thermometer
Knives system
Knife steel and pouch system
Hi-lo platform system
Leg cut-off and breast saw, tail puller system
Inspector steps and beef scribe saw system
Patty machine
Grinder - mixer
Meat case complete
Cash and wrap counter
Meat slicer
Scales
Tenderizer
Portion scale
High pressure washer, complete

Livestock Meat Processing Equipment (Continued)

Beef splitting saw
Viscera inspection table
Cutting-boning table
Trimming table
Hog scald
System meat trees
Carcass drop
Meat trucks
Pickling tank
Tote box system
Elastic net and S/S meat insort, complete
Track scales
Brune and pickling pump
Smokehouse
Electric skinning knife
Hog singer
Inspection stamp

Poultry Processing Equipment

Shackling equipment
Electric shocker
Bleeding knives
Scalding equipment
Rubber fingered pickers
Singeing equipment
Chillers

Fish Processing Equipment

Washing equipment
Mechanical scaling equipment
Mechanical gutting equipment
Mechanical heading equipment
Mechanical skinning equipment
Mechanical filleting equipment

Dairy Processing Equipment

Milk tanker
Milk storage tanks
Clarifier
Pasteurizer
Homogenizer
Cooler
Filler
Packaging equipment
Long handled dipper
Casers
Stackers
Milk cases
Raw milk pump
Recorders
Thermometers
Timing pump
Balance tank
Holding tube
Flow diversion valve
Pasteurized milk storage tank
Refrigeration system
Cold storage area
Dolleys
Parts washer
Water heating system

Fruit and Vegetable Canning Equipment

Conveyors
Washing machine
Trimming machine
Peeler
Cutting machine
Blancher
Cooker
Filling equipment
Closing equipment
Inspection table
Preparation tables
Exhaust box
Filler (semi-automatic)

Fruit and Vegetable Canning Equipment (Continued)

Retorts
Retort instruments
Retort crates
Plate heat exchanger (high temperature-short time)
1/2-ton hoist and monorail
Filter pump
50 h.p. oil burning boiler
Air compressor
Refrigeration compressor

APPENDIX B

SUGGESTED REFERENCES FOR INSTRUCTIONAL UNITS

Agricultural Products: Student Study Guide and Answer Book. Montgomery, Alabama: Agricultural Education Service, State Department of Education. 126 pages.

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APPENDIX C

SELECTED LIST OF PROFESSIONAL AND TECHNICAL SOCIETIES AND ORGANIZATIONS CONCERNED WITH AGRICULTURAL PRODUCTS (FOOD PROCESSING) AND ITS APPLICATION

Inclusion or omission of an organization or society in this list does not imply approval or disapproval of it. Additional information regarding local chapters or sections of these organizations or societies may be obtained by writing directly to the executive secretary at the listed address.

American Meat Institute, 59 East Van Buren Street, Chicago, Illinois 60605

Institute of American Poultry Industries, 67 East Madison Street, Chicago, Illinois 60602

Institute of Food Technologists, 221 North La Salle Street, Suite 2120, Chicago, Illinois 60601

Institute of Sanitation Management, 55 West 42nd Street, New York, New York 10036

National Agricultural Chemicals Association, 1155 15th Street, N.W., Washington, D.C. 20005

National Association of Frozen Food Packers, 919 18th Street, N.W., Washington, D.C. 20006

National Canners Association, 1133 20th Street, N.W., Washington, D.C. 20036

National Fisheries Institute, 1614 20th Street, N.W., Washington, D.C. 20009

National Prepared Frozen Food Processors Association, P. O. Box 37, Little Neck, Long Island, New York 11363

Processed Apples Institute, Inc., 30 East 40th Street, New York, New York 10016

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